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DISEASES CAUSED BY BACTERIA AND FUNGI.

GEWENIGER. (1932). Zur Frage der Differenzierung des Streptococcus equi (Druse). Erwiderung auf die Arbeit von H. Haupt: Zur Biologie des Streptococcus equi und des Streptococcus agalactiae. *Zlb. Bakt. I.* (*Orig.*). 1931, **120.** 291-303. [**The Differentiation of** *Streptococcus equi* **(Strangles). Reply to H. Haupt's Paper: The Biology of** *Streptococcus equi* **and of** *Streptococcus agalactiae*].—*Zlb. Bakt. I.* (*Orig.*). **124.** 236-238. 1 table.

HAUPT could not confirm the statement of Geweniger [(1928). *Zschr. Veterinärk.* **40.** 81.] that lactose added to milk and other liquid media is fermented by *Str. equi*. In the present paper Geweniger supports his statement by the results of further experiments. The retests were carried out by the Army Veterinary Service with more than 300 strains of *Str. equi* isolated from fresh cases of strangles. The author concludes by stating that *Str. equi* reddens lactose broth and litmus milk without coagulating the latter or reducing the litmus dye; aqueous lactose solution [Bariekow II], however, is not changed.

Str. pyogenes coagulates litmus milk and reddens lactose broth as well as Bariekow II.—R. WETZEL (HANOVER).

HAUPT, H. (1933). Zur Frage der Differenzierung des Streptococcus equi Schütz 1888. [**The Differentiation of** *Str. equi* **Schütz 1888**].—*Zlb. Bakt. I.* (*Orig.*). **128.** 110-112.

Contrary to the results of GEWENIGER, Haupt has found that occasional strains of the strangles streptococcus, *Str. equi*, may cause a temporary reduction of litmus milk, but that lactose is never fermented.

[An explanation for the different findings of the two workers may be that the same streptococcus group may produce different changes in litmus milk, depending upon the amount of inoculum sown and that biochemical reactions should only be judged when a sugar-free basic medium is used].—S. J. EDWARDS.

WILLEMS, R. (1933). La streptococcie du porc. [**Streptococcal Infections of the Pig**].—*Ann. Méd. vét.* **78.** 105-117.

Streptococcal infections in the pig have already been brought to notice, more particularly in Germany. The author records 868 laboratory examinations of porcine material in which he found 33 per cent. to be streptococcal infections. He believes that 50 per cent. of deaths in pigs under three months old and 20 per cent. in pigs of all ages are due to streptococci. Over a period of eight years he has found that pasteurella infections only account for 8 per cent. of deaths, being

rare in new-born pigs and very infrequent during the suckling period. Diagnostic symptoms in streptococcal infections are absent. Arthritis, bursitis and skin lesions of varying intensity may be present. A bacteriological examination is necessary to establish a diagnosis. *Post-mortem* lesions are almost absent. There may be present a serofibrinous or haemorrhagic exudate in the pericardium, disseminated areas of hepatization in the lungs with oedema of the remaining lung tissue, and hypertrophied and congested bronchial lymphatic glands. The abdominal organs are almost unaffected.

Streptococcal colonies may be slow in developing and few in number. Some strains approach *Streptococcus pyogenes* in type, others do not. Haemolytic and pathogenic properties vary in different strains.

The author believes the disease to be contagious though it may arise spontaneously and affect only some pigs in a litter. He considers the prevention of the condition to be along the lines of observance of hygienic and dietetic rules.
—S. H. GAIGER.

HUDSON, C. B. (1933). **A Specific Infectious Disease of Chickens due to a Hemolytic Streptococcus.**—*J. Amer. Vet. Med. Ass.* **82.** 218-231. 3 tables. [4 refs.]

The author describes an outbreak of disease due to a haemolytic streptococcus which causes a highly fatal septicaemia. The causative organism occurs in large numbers in the blood and organs in chains of 2 to 20 cells with chains of 6 to 8 elements predominating.

The susceptible portal of entry is shown by experiments to be the nasal cavity. In the experiments some birds were not infected by intranasal inoculation but became carriers, the organism being isolated from the nasal cavity of these birds.

The *post-mortem* findings in affected birds are haemorrhagic discolouration of the breast and an enlarged liver, showing pin-point necrotic foci and covered with a clear plastic exudate streaked with extravasated blood.

The body cavity contains a small amount of reddish-coloured fluid. The heart muscle shows haemorrhagic discolouration and the ventricles contain an abnormal amount of discoloured serum. The pericardial fluid is also reddish in colour.—NORMAN DOBSON.

I. EVANS, Alice C. (1933). **Bacillary Forms in Hemolytic Streptococcus Cultures.**—*J. Bact.* **25.** 95-96. [Paper read at 34th Ann. Meet. Soc. Amer. Bacteriologists].

II. WHITEHEAD, H. R., & COX, G. A. (1933). **Observations on Some Factors in the Milk of Individual Cows which modify the Growth of Lactic Streptococci.**—*Biochem. J.* **27.** 951-959. 3 figs., 5 tables. [8 refs.]

III. HART, P. D., & ANDERSON, A. B. (1933). **The Discolouration of Heated Blood by Streptococci.**—*J. Path. & Bact.* **37.** 334-335. [3 refs.]

I. A certain strain of haemolytic streptococcus grows in a bacillary form when subjected to suitable conditions. An attempt to complete the metamorphosis permanently from a coccoid to a bacillary form of growth failed.

II. Leucocytes when present in large numbers in milk have the effect of inhibiting the development of lactic acid-producing streptococci. This inhibition is removed by heating to 50°C. for 30 seconds. The presence of leucocytes in small numbers has an apparent stimulating effect upon the growth of these organisms. The stimulating factor is not destroyed by heating to 63°C. for 30 minutes.

III. Streptococci were grown upon a chocolate blood agar to which had been

added a colourless catalase solution extracted from pork fat. No green discolouration of the medium occurred. This fact is taken as additional evidence that the discolouration of plain chocolate blood agar by streptococci is due to the formation of hydrogen peroxide.—E. J. PULLINGER.

DAY, H. B. (1933). **Species Immunity to Virulent Streptococci.**—*J. Path. & Bact.* **37.** 169-177. 4 tables. [6 refs.]

The author claims that when streptococci, both haemolytic and non-haemolytic, become exalted in virulence they develop a special species antigen, termed " V " antigen, which is quantitatively related to virulence. He believes that this antigen is responsible for their resistance to phagocytosis and to extraction with acid. Their agglutination reactions are also modified. In broth cultures the " V " antigen is only formed by highly virulent strains during the phase of active growth and is almost entirely attached to the cocci. In serum broth it is also present in the culture fluid and persists longer. It is resistant to acid, destroyed by heating in an alkaline medium or by exposure to bacterial enzymes and readily adsorbed to protein when the latter is precipitated. Injection of the " V " antigen is said to excite active immunity to all virulent streptococci, haemolytic or non-haemolytic, and the sera produced confer passive immunity.

These findings are discussed in their relation to the work of HARE [this *Bull.* **2.** 102.] and of TODD & LANCEFIELD [(1928). *J. Exp. Med.* **48.** 751].

—A. W. STABLEFORTH.

EDWARDS, S. J. (1933). **Studies on Bovine Mastitis. IX.—A Selective Medium for the Diagnosis of Streptococcus Mastitis.**—*J. Comp. Path. & Therap.* **46.** 211-217. 2 figs., 1 table. [11 refs.]

A selective medium for the cultivation of streptococci from milk samples is described. The basis is plain agar containing 5 per cent. ox blood, and to this is added crystal violet (1 : 500,000) and aesculin (0·1 per cent.). The dye inhibits the growth of common milk saprophytes, while those which resist its action may be distinguished from streptococci by their blackened colonies. [For abstracts of previous articles of this series see this *Bull.* **2.** 366 and 588, and **3.** 586].

—S. J. EDWARDS.

EDWARDS, P. R. (1933). **A Note on Some Recent Work in Experimental Bovine Mastitis.**—*Cornell Vet.* **23.** 177-184. 1 table. [16 refs.]

Edwards points out that the strain of haemolytic streptococci which HADLEY and FROST obtained from his laboratory and which they used for infection experiments on the cow under the name *Str. equi* resembles typical *Str. equi* in that it does not ferment lactose or sorbitol, but is distinguished from that species by the fact that it ferments trehalose and reduces methylene blue, and also never produces capsules.

He also points out that the strain which was labelled *Str. epidemicus* in the same series of experiments was isolated in his laboratory from the os uteri of a mare affected with metritis and that, though otherwise like *Str. epidemicus*, it was distinguished by the fact that it fermented sorbitol. Sorbitol fermenting strains were not found amongst 115 cultures from human beings, many of which were from throats [this *Bull.* **3.** 587].—A. W. STABLEFORTH.

ROSELL, J. M., & MILLER, W. T. (1933). **A Biological and Bacteriological Study of Bovine Mastitis.**—*J. Amer. Vet. Med. Ass.* **82.** 587-607. 1 table. [52 refs.]

An examination was made of samples of milk from each quarter of 70 cows taken at random from a large hand-milked dairy herd of good type which was producing a high yield of good quality milk. Mastitis was known to be present and was of the chronic variety, but its incidence was believed to be low at the time the test was begun.

Of 280 quarters, 232 (82·8 per cent.) were classed as abnormal by one or other of the tests used. The percentage of these 232 quarters which reacted to the individual tests was as follows :—chlorides (over 0·142 per cent.) 82·7 per cent. ; catalase (more than 0·5 c.c. of gas from 15 c.c. of milk) 72·6 per cent. ; brom-thymol-blue test 30 per cent. ; macroscopic sediment test (more than 0·1 c.c. [?] from 10 c.c. of milk) and microscopic test for leucocytes 59·5 per cent. ; palpation 65·6 per cent. ; black cloth test 6 per cent. Using surface cultivation on Klimmer, Haupt and Root medium or on 5 per cent. horse blood agar, streptococci were found in 41 per cent. of quarters abnormal to other tests and in 21 per cent. of the 48 quarters which were classified as normal according to other tests.

Repetition of samples from certain animals showed that the chlorides, catalase, reaction and bacteriological tests did not always give the same results. Of 41 strains of streptococci isolated and further examined, 35 proved to be *Str. agalactiae* (mastiditis), two *Str. bovis*, one *Str. mitis* and three *Str. faecalis*. The strains of *Str. agalactiae* had the usual characters of this organism. Rosell, however, has also noted that certain strains may reduce methylene-blue milk particularly if the inoculum is not small. None produced β haemolytic colonies. Cultivation was, however, on the surface and horse blood was used. Micrococci were present in most samples and diphtheroid rods in 10 per cent.

About 40 swabs were taken from the teats, udder, nose, flanks, feet, etc. of cows and from floors of the byres after they had been well washed. The flora described include *Str. pyogenes*, *Str. faecalis*, *Str. bovis* and *Str. mitis*, but on no occasion was *Str. agalactiae* found.—A. W. Stableforth.

I. Hucker, G. J. (1933). **A Review of the Bacteriology of the Normal and Infected Udder.**—*J. Bact.* **25.** 58.

II. Wahby, A. M., & Sherman, J. M. (1933). **The Growth of Pathogenic Organisms in Milk.**—*Ibid.* 60.

III. Fitch, C. P., & Bishop, Lucille M. (1933). **Presence of Bact. abortus Bang in Raw Milk, Butter and Ice Cream.**—*Proc. Soc. Exp. Biol. & Med. New York.* **30.** 1205-1207. [7 refs.]

[I and II. Papers read at 34th Ann. Meet. Soc. Amer. Bacteriologists].

I. A summary of work done on the flora of the so-called normal udder and on pathogenic organisms, especially streptococci.

II. A report on tests for milk-borne bacteria, etc., showing that the optimum temperature for their *active* growth is 30°C. ; at 15°C. growth was observed in all cases except in the case of *Br. abortus* and *Vibrio cholerae* ; little growth of course occurred at 5°C.

III. A summary of paper 1186 of the journal series of the Minnesota Agricultural Experiment Station. The effects of the milk regulations of two municipalities are compared, one of which required, and the other did not, that all milk sold as raw should come from cows negative to the agglutination test for Bang's disease. In the latter case *Br. abortus* was found in 6 out of 12 samples. Other work showed that the brucella could be isolated from buttermilk, salted and unsalted butter, and ice-cream. Experiments are in progress to determine how long *Br. abortus* will survive in butter and ice-cream.—F. Bullock.

I. HUCKER, G. J. (1933). **Relationships of Leucocytes and Streptococci to Fibrosis of the Udder.**—*Amer. J. Publ. Health.* **23.** 237-245. 6 figs., 5 tables. [3 refs.]

II. PASCAL. (1933). Une forme de mammite : La mammite paraplégique des vaches laitières. **[A Form of Mastitis : Paraplegic Mastitis in Milch Cows].** —*Bull. Soc. Sci. vét. Lyon.* **36.** 104-108. [6 refs.]

I. This paper contains the results of an extended study by the author into the relationship between the presence of cells and streptococci in milk, and the presence of indurations or scar tissue in the udder. The findings confirm those already published by HUCKER and UDALL [this *Bull.* **3.** 654].

II. The writer describes a form of acute mastitis due to a coliform organism in which a paralysis of the limbs was a prominent symptom. The condition was successfully treated by frequent stripping, and by injection of polyvalent antivirus intravenously and into the infected quarter.—S. J. EDWARDS.

I. ZIEGLER, M., & BERGMANN, G. (1933). Studien über das Zellbild der Milch bei Mastitis. I. Mitteilung. Das Zellbild der Milch bei der tuberkulösen Mastitis. **[Studies on the Cell Picture of Milk in Mastitis. I. The Cell Picture of Milk in Tuberculous Mastitis].**—*Zschr. Infektkr. Haust.* **43.** 211-238. 3 tables, 1 plate. [27 refs.]

II. CHERRINGTON, V. A., HANSEN, H. C., & HALVERSEN, W. V. (1933). **The Leucocyte Content of Milk as Correlated with Bacterial Count and Hydrogen Ion Concentration for the Detection of Mastitis.**—*J. Dairy Sci.* **16.** 59-67. 3 tables. [11 refs.]

I. The authors present a detailed account of the cell picture in the milk sediment and the pathological anatomy of 124 bovine udders affected with tuberculosis.

By means of clinical and histological findings the types of tuberculous mastitis could be arranged under the following headings :—a disseminated miliary form, a caseous form and a lobular-infiltrating form. About 90 per cent. of the cases examined could be placed in the latter category and in the majority of these cases the milk sediment showed a typical cellular content. What could be regarded as characteristic for this form was the preponderance of epithelioid cells which did not necessarily appear in the form of aggregations or groups. In the caseous form a marked degeneration of the cellular elements was in evidence.

The authors regard the structure of the cells in the milk sediment as an invaluable aid in the diagnosis of tuberculous mastitis.

II. This paper presents experimental data concerning the laboratory diagnosis of mastitis in cows. Aseptically drawn milk samples representing the individual quarters of each udder were examined by the following tests :—(a) bacterial count on plain blood agar ; (b) cell contents estimated by the method of PRESCOTT and BREED and (c) reaction by the brom-cresol-purple test and by the quinhydrone electrode.

Of these methods the leucocyte content of the milk was regarded as the truest indicator of mastitis. Analysis of 758 leucocyte counts seemed to warrant the conclusion that milk from normal udders usually contained less than 50,000 leucocytes per c.c., whereas milk from infected udders almost invariably contained more than 100,000 leucocytes per c.c.—S. J. EDWARDS.

STECK, W., BACHMANN, W., KAESTLI, P., & GYGAX, E. (1933). Studien zur Galtbekämpfung. II. Mitteilung. Epizootologische Beobachtungen.

[Studies on the Control of Bovine Mastitis. II. Epizootiological Observations].—*Arch. wiss. prakt. Tierhlk.* **66.** 47-59. 18 tables. [12 refs.]

Systematic bacteriological and clinical observations are given which illustrate the spontaneous cessation of clinical mastitis in a herd.

The herd originally contained 17 cows of which four had severe mastitis of the common chronic variety and two had " udder catarrh," whilst four further cows showed, at times or constantly, typical mastitis streptococci and five others streptococci whose nature was not ascertained.

During the year of observation no further clinical cases of mastitis occurred. One cow developed a latent infection of one quarter. Seven cows, of which four were in close contact with the badly affected animals, remained free from permanent infection. Twelve quarters of animals already badly infected in one or more quarters remained free, whilst five quarters became latently infected and one quarter lost the infection.

The infection thus remained in a latent form but had lost its tendency to spread quickly or to cause severe disease. Animals under five years remained uninfected, whilst two older cows which were less exposed developed a latent infection.—A. W. Stableforth.

I. Seelemann, M. (1933). Vorschläge betr. Einführung und Organisation der Galtbekämpfung. **[Proposals for the Introduction and Organization of Mastitis Control].**—*Deuts. tierärztl. Wschr.* **41.** 385-388. [1 ref.]

II. Lentz, W. (1933). Sind wir bei der Bekämpfung der Streptokokken-Mastitis auf dem richtigen Wege? **[Are we Combating Streptococcus Mastitis on the Right Lines?]**—*Ibid.* 438-440.

III. Rosell, J. M. (1933). **Laboratory and Field Methods of Milk Testing for the Detection of Mastitis.**—*Oka Agric. Inst. & Vet. Coll. Univ. Montreal. Res. Ser.* No. 40. pp. 22. 1 table. [6 refs.]

I. Seelemann discusses the broad principles for the control of chronic streptococcus mastitis and emphasizes the necessity for state aid in this direction.

II. The author states that since vaccination and therapeutic measures are of doubtful value in combating mastitis, attention should be directed towards prevention of the disease by proper management and feeding of milking cows.

III. The usual methods of detecting chronic streptococcus mastitis in its latent state are considered.—S. J. Edwards.

I. Seelemann, M. (1933). Ueber den gegenwärtigen Stand der Bekämpfung des gelben Galtes. **[The Present State of the Campaign against Chronic Bovine Mastitis].**—*Deuts. tierärztl. Wschr.* **41.** 259-264. [7 refs.]

II. Seelemann, M. (1933). Die Durchführung der Galtbekämpfung und -behandlung in der Praxis. **[Mastitis Control and Treatment in Practice].**—*Ibid.* 337-345. [5 refs.]

I. Chronic bovine streptococcic mastitis must be attacked systematically. Stripping of diseased quarters may in some cases produce a temporary improvement but is seldom of lasting value. Thorough milking should, however, always be insisted on. Similarly a prolongation of the dry period may be of some value but it is uneconomical. Wet milking is to be avoided. The basis of all methods of controlling mastitis is the detection of infected animals by laboratory examination and the prevention of spread from infected animals by the institution of hygienic precautions.

Recent work has shown that udder infusions repeated two, three or possibly four times—in this case with entozon 1 : 1,250—are of definite value in dealing with infected animals.

II. In the second contribution, Seelemann stresses the futility of treating single cows in a herd and recommends strongly that the veterinarian in practice should always endeavour to persuade the owner to have a laboratory test of the milk of every cow and follow this by segregation of affected animals in one or more sheds and the adoption of hygienic measures. Secondly, he considers that treatment should only be begun when this has been done ; further, that not only clinical cases but all infected cows should be treated even though the disease is quiescent. Emphasis is constantly laid on the necessity of a thorough-going effort and the uselessness of sporadic attacks on the problem.

Details of the method of treatment by udder infusions are given.

—A. W. Stableforth.

I. Seelemann, M. (1933). Résultats des recherches allemandes les plus récentes en ce qui concerne les infections streptococciques de mamelle avec considérations particulières sur la chimiothérapie de la mammite chronique. [**Recent German Research on Streptococcus Infection of the Udder and particularly Chemotherapy**].—*Le Lait.* **13.** 421-432. [17 refs.]

II. Seelemann, M. (1933). Zur Frage des experimentellen Nachweises des Infektionsweges der Galtstreptokokken. [**The Route of Infection of Mastitis Streptococci**].—*Arch. wiss. prakt. Tierhlk.* **66.** 168-172. [9 refs.]

III. Seelemann, M. (1933). Zur Galtbehandlung. [**The Treatment of Mastitis**].—*Tierärztl. Rdsch.* **39.** 221-224. [7 refs.]

I. Emphasizing the seriousness of chronic streptococcal mastitis, Seelemann discusses, with moderation, the value and difficulties of controlling mastitis by hygienic methods and then passes to the question of treatment by udder injection, a proprietary preparation, entozon, being favoured. Details are given regarding the choice of animal and time of treatment, the preparation of the solution, the quantity to be injected, the period of time for it to be retained in the udder and the necessity of repetition. The author stresses the necessity of controlling the results by subsequent bacteriological examination. [See also this *Bull.* **3.** 101 and 160].

II. Polemic on the article of Schmidt-Hoensdorf and Schmidt [this *Bull.* **4.** 4.] in which Seelemann points out that his attempts to produce mastitis experimentally were, numerically, less successful because they were not made by injecting culture *via* the teat canal—a method established long ago—but by " wet milking " with infected hands or by stabling on infected straw in imitation of the probable natural method of infection.

III. A general discussion of the treatment of bovine mastitis by udder infusion, with particular reference to Steck's work on the injection of chemical irritants (Reizversuche). Seelemann believes that the method in which the first 6 to 12 jets of milk are discarded before sampling, and in which only 0·5 c.c. of whole milk is plated, is unsatisfactory and pleads for a thorough examination at all times for the protection of the cattle owner.—A. W. Stableforth.

I. Lesbouyries, & Adam. (1933). L'antivirusthérapie des mammites streptococciques de la Vache. [**Antivirus Therapy in Bovine Streptococcus Mastitis**].—*Bull. Acad. vét. France.* **6.** 135-145. 3 charts. [9 refs.]

II. Cotoni, L., Césari, E., & Chambrin, N. (1933). Recherches sur la préparation du sérum anti-streptococcique. [**Research on the Preparation of Antistreptococcus Serum**].—*Ann. Inst. Pasteur.* **50.** 608-631. 2 tables. [22 refs.]

I. A study was made of the therapeutic action of filtrate derived from the

broth culture of a mastitis streptococcus strain on the udders of cows affected with mastitis.

The intramammary injection of 40 c.c. of such filtrate caused the disappearance of clinical symptoms of the more acute form of the disease and the return of the milk to normal. The streptococcus content of the milk, however, was only temporarily reduced. The injection of antivirus into the udders of cows affected with the latent form of the disease caused a reduction in the number of streptococci both in the injected quarter and in the other infected quarters.

The authors recommend the use of antivirus during the drying period in order to prevent the development of clinical symptoms.

II. The first part of this paper deals with the preparation of an antistreptococcus serum from horses and rabbits.

A satisfactory method for the immunization of rabbits was found in the injection of a virulent streptococcus culture treated with sodium ricinoleate which was found to be bactericidal in a concentration of 1 : 2,000. This antigen was injected intravenously daily for four days, after which an interval of ten days intervened before testing the degree of immunity produced.

The results obtained varied with the type of organism used for inoculation. Thus, with one avian strain pathogenic in doses of 10^{-6} c.c., 11 out of 16 rabbits survived the injection of 100 M.L.D. ; with two equine strains, out of six rabbits tested in each case, all were found to resist an even higher dose.

It was found that the administration of 0·5 c.c. of serum from a rabbit that had received a series of three injections, as described, protected mice against 1,000 M.L.D., and that 10 c.c. of the same serum protected rabbits against 100 M.L.D.

A serum of high protective value for the rabbit, prepared in the same way as before, could also be obtained from the horse. This serum was found to have a curative action in the case of rabbits which had received lethal doses of streptococcus culture, provided that it was administered within four hours.

The second part of the paper deals with the serological classification of streptococci in order to determine suitable types for the preparation of immune sera. Forty-eight strains from human and animal sources were examined by the precipitation test used by LANCEFIELD, immune sera being obtained from rabbits. The strains could be arranged in four groups, one of which consisted entirely of those originating from animal sources.—S. J. EDWARDS.

JUNGHERR, E. (1933). **Staphylococcal Arthritis in Turkeys.**—*J. Amer. Vet. Med. Ass.* **82.** 243-249. 4 figs. [17 refs.]

This article deals with an infection in four seven-month-old bronze turkeys. In all the birds the tibiometatarsal joints were enlarged, fluctuating, hot, painful and affected with superficial ulcerations comparable, it is stated, to decubital sores. Each of the four birds showed a varying degree of lameness.

Investigation of the joints and the surrounding tissues showed a condition varying from a serous exudate to layers of dry yellow cheesy material.

Bacteriological examination of the affected birds showed the presence of a Gram-positive coccus, which is considered to be *Staphylococcus aureus.*

—NORMAN DOBSON.

I. BASSET, J. (1933). Le vaccin anticharbonneux chez le Lapin. **[Anti-Anthrax Vaccine in the Rabbit].**—*C. R. Soc. Biol. Paris.* **114.** 35-38.

II. BASSET, J. (1933). Vaccination contre le charbon bactéridien. **[Vaccination against Anthrax].**—*Ibid.* 39-42.

III. Basset, J. (1933). Etiologie et pathogénie du charbon bactéridien. **[Aetiology and Pathogenesis of Anthrax].**—*Ibid.* 42-45. [2 refs.]

I. In this publication the author states that, where death follows the administration of anthrax vaccine in rabbits, it is found to result in the majority of cases from mechanical asphyxia caused by oedema of the throat. He adds that, contrary to the commonly accepted view, the occurrence of a large oedematous lesion does not indicate the focus of infection or the point of vaccine injection, as oedema may occur at a site some distance from the point of injection. It is suggested that this may explain the accidents which so frequently follow anthrax vaccination in horses.

II. Single injections of good spore vaccines will produce a solid immunity in sheep in seven days either by the intradermal or the subcutaneous route. Vaccines should possess a certain degree of virulence in order to confer immunity and accidents are more dependent upon the vaccine than upon the route adopted.

III. Natural anthrax infection is stated by the author to depend upon the existence of some local or general favouring circumstance of the tissues. This he considers is the probable explanation of the fact that anthrax in animals is so frequently alimentary and so rarely intrathoracic in origin.—Gwilym O. Davies.

I. Rockwell, G. E. (1933). **Active Immunization to Anthrax by means of Heterophile Antigen.**—*Science.* **77.** 612. [5 refs.]

II. Besredka, A. (1933). Au sujet du rôle de la peau dans l'infection charbonneuse. Quelques remarques à propos du mémoire de MM. Boquet et Saenz. **[Role of the Skin in Anthrax].**—*Ann. Inst. Pasteur.* **51.** 32-37. [2 refs.]

III. Boquet, A., & Saenz, A. (1933). Au sujet du rôle de la peau dans l'infection charbonneuse. **[Role of the Skin in Anthrax].**—*Ibid.* 38-39.

IV. Munné, J. V. (1933). Contribution à l'étude de l'immunité anticharbonneuse. **[Anthrax Immunity].**—*C. R. Soc. Biol. Paris.* **114.** 100-102.

I. An experiment by the author indicates that a heterophile antigen in sheep corpuscles protects rabbits from anthrax infection. Two rabbits were each given five injections of boiled sheep corpuscles and when tested two weeks after the last injection resisted an injection of virulent anthrax bacilli. Two control rabbits died within four days.

II. Boquet and Saenz in a previous paper [this *Bull.* **4.** 148.] on the comparative receptivity of tissues to anthrax infection concluded that, contrary to the opinion of Besredka, the skin does not possess an exclusive sensitivity to anthrax infection. In this paper Besredka comments on their findings and, after expressing surprise at the conclusions of Boquet and Saenz, formulates his own conclusions from their work. He states that their findings do not contradict but confirm his own published views and those of his collaborators, that the skin and the mucosae which are continuous with the skin play the chief part in anthrax infection.

III. Boquet and Saenz reply to this comment. They state that their difference of opinion with Besredka rested on the definition of the term " revêtement cutané " but, as they now understand that the term as used by Besredka includes the mucosae, this difference of opinion no longer exists.

IV. As a result of experiments with guinea pigs, the author concludes that no appreciable protection is afforded against test doses of Pasteur's second vaccine by oedematous fluid, or the macerated products of oedematous lesions which have been produced by inoculation of an asporogenous strain of anthrax and sterilized by filtration or boric acid.—Gwilym O. Davies.

KELLER, H. (1933). Ueber die Tuberkulose der Tonsillen des Rindes. **[Tuberculosis of the Tonsils in Cattle].**—*Zschr. Fleisch- u. Milchhyg.* **43.** 265-268. [8 refs.]

After reviewing the incidence of tuberculosis of the tonsils in cattle, as quoted by various authorities, and discussing the methods of infection, etc., the author concludes that this condition is more widespread than was previously thought, and is generally secondary to open lung tuberculosis in cattle. He recommends that the tonsils should be carefully examined in routine meat inspection, in addition to the usual lymph glands of the head and neck.—D. J. ANTHONY.

JORDAN, L. (1933). **The Eradication of Bovine Tuberculosis.**—*Med. Res. Council. Gt. Britain. Spec. Rep. Ser.* No. 184. pp. 104. 1 fig., 49 tables. [31 refs.] London: H.M. Stat. Office. [8vo] [2s.]

This report describes the results of a large scale experiment, conducted under the auspices of the Medical Research Council, to determine how far the eradication of tuberculosis could be achieved by enlisting the co-operation of dairy farmers and granting them free tuberculin testing and free expert advice.

Before proceeding to discuss the results of the scheme, which is the particular purpose of this report, the author points out the need for eradication and summarizes the benefits which would accrue. The advantages and disadvantages of the various methods which can be employed are also considered.

For the experiment, which lasted three years, an area about nine square miles in extent, situated to the north-east of Mauchline, Ayrshire, was chosen. The area contained 37 farms of which only three owners refused to participate. Of the 34 farmers participating in the scheme two had already licensed herds and two others dropped out during the experiment, leaving 30 farms finally in the eradication experiment.

The method adopted was a modified form of BANG'S recommendations. Herds were tested with tuberculin (intradermal method) at six-monthly intervals; reactors were isolated, and infected stock were gradually replaced by healthy stock, the detailed measures adopted on each farm being adjusted according to individual circumstances. At the first test, eight herds were found to be free, but at the end of three years the number had increased to twenty, this number including farms having 26·8, 33·3 and 41·6 per cent. reactors respectively at the initial test. Of the remaining ten herds, eight recorded considerable improvement, the percentage of reactors having been reduced from an average initial infection of 51·8 per cent. to 23·7 per cent. at the end of the experiment. In two herds, the author states that no consistent efforts were made to eradicate infection and their results constituted very striking controls over the remainder. In one case infection increased from 36·9 per cent. to 54·7 per cent. whilst the other showed an increase from 49 per cent. to 61·6 per cent.

Apart from the eradication of disease the co-operating herds revealed striking improvement in their general condition together with a marked increase in their average valuation which more than compensated the owners for the small expense incurred during the eradication process.

It is also stated that the investigation has demonstrated the reliability of the double intradermal test as a diagnostic agent when applied to a large-scale-eradication scheme. In the course of approximately 10,000 tuberculin tests, only 42 tests gave contradictory results and these were almost entirely confined to young cattle.

Regarding the reduction of milk infection the author states that his results "show conclusively that manual examination of the udder, as carried out in

routine clinical inspections, may fail to identify an animal which is actively secreting tubercle bacilli in the milk" and his observations "also provide clear evidence that neither the Tuberculosis Order nor routine clinical inspection is effective as a safeguard against the tubercular infection of milk destined for human consumption."

The report has four appendices, three of which are devoted to detailing the methods employed in the scheme, together with particulars of individual herds and the cost of eradication. Appendix IV deals with measures taken in various countries to combat bovine tuberculosis.—GWILYM O. DAVIES.

REGNÉR, G. (1933). Ett försök till bekämpande av notkreaturstuberkulos inom visst mindre område. [**Attempt to combat Bovine Tuberculosis in a Small District**].—*Svensk Vet.-tidskr.* **38.** 205-216. 3 tables.

An attempt was made to control tuberculosis in two small districts. Those under consideration were two parishes in which tuberculosis seemed to be increasing rapidly.

Clinical examination of all cattle over two years old was begun on the 2nd February, 1924. Those under two years were only examined if definitely suspected. No more than 50 animals were to be examined in one day and udder tuberculosis was dealt with under the regulations of 1908. In the case of other types of infection, discharge or other material was sent at the discretion of the veterinary surgeon to the state laboratory for diagnosis and the suspected animals earmarked. Affected animals were slaughtered within 14 days of diagnosis unless the veterinary surgeon allowed a longer period.

Valuation was arrived at after slaughter according to the weight of the sides of beef, the price per kg. body weight being the wholesale price ruling at the time in the district. Compensation to the owner was one quarter of the value computed as above, if the whole carcass was passed as fit for human food. Three-quarters of the value of the condemned meat was added in other cases with a minimum of 60 kr. (about £3.3.0.) and a maximum of 100 kr. (about £5.5.0.).

The part of the carcass fit for food remained the property of the owner, who was allowed to dispose of it as he pleased.

Veterinary surgeons' fees were 1 kr. for every animal examined and ordinary professional fees for *post-mortem* examinations.

In the parish of Lillherrdal 83 of the 196 herds were infected at the onset : 27 herds were really badly infected, showing a percentage of 67·25 affected animals ; of these 27 herds 23 were tuberculosis-free at the end of the period as shown by the tuberculin test. The other four were not tuberculin tested, but only clinically examined.

In the parish of Linsäll 31 of the 178 herds were infected at the beginning of the experiment ; seven were really badly infected, with 44·2 per cent. of affected animals. At the last tuberculin test in 1932, six of these herds were free. The seventh was known not to be free in June, 1930.

The scheme has been voluntary, but state aided. In the 374 herds there are now very few doubtful animals and they are in the herds of the few owners who would not join the scheme.—A. A. FORSYTH.

—. (1933). **Eradicating Bovine Tuberculosis.**—*J. Amer. Med. Ass.* **100.** 500-502. [12 refs.]

This article records that in parts of the United States of America there is a struggle over the question of eradication of bovine tuberculosis as a health measure. In Iowa, troops have had to be employed to enforce the testing of cattle in accordance with the law, but finally the Secretary for Agriculture has declared a holiday

on testing, pending legislative action. The relationship of bovine to human tuberculosis is discussed and it is stated that " the issue from the standpoint of the public health, is clear. Cattle as a source of human tuberculosis must be controlled."

The United States has adopted the so-called area plan for eradicating bovine tuberculosis. This consists of testing all the animals in a given area (county) under authority of a state law which makes such testing mandatory when a specified percentage of owners have signed a petition for it. The state, aided by federal subsidies, indemnifies the farmers for the larger part of their loss.

Although most farmers and dairymen, recognizing the economic advantages as well as public health demands for tuberculosis-free cattle, favour the eradication of tuberculosis by the means described, there has been considerable opposition grounded on the failure of some farmers to comprehend the seriousness of the need for eradication of tuberculous cattle, plus a lack of understanding of the test itself and what it means. The sentiment against the test has been skilfully fanned by propagandists. Objections raised have included the charge that the system is engineered by the packers in order to get beef at their own prices, this being coupled with the accusation that unfit meat from these animals was used for food. The test has even been blamed for abortion and " stringy milk." This propaganda, assiduously spread, has impressed a sufficient number of farmers to cause opposition. Wiser heads among the dairymen and farmers know that, if statute law is rescinded, the inexorable force of economic law will compel testing sooner or later ; for enlightened parents, demanding safe milk for their children, will ensure that ultimately there will be no market for the produce from untested herds. Pasteurization, the article points out, will help to protect the cities, but even that is subject to human error and carelessness, and when imperfectly carried out it has been shown to be ineffective in protecting the user of milk against tuberculosis. The medical profession is exhorted to rally to the defence of the public against its own folly.—Ll. E. W. Bevan.

I. Watson, E. A. (1933). **Studies on Bacillus Calmette-Guérin (B.C.G.) and Vaccination against Tuberculosis.**—*Canad. J. Res.* **9.** 128-136. 5 figs. on 2 plates, 2 tables.

II. Deambrogio, L. (1933). La vaccinazione col " B.C.G." La lotta contro la tubercolosi bovina. [**BCG Vaccination against Bovine Tuberculosis**].—*Profilassi.* **6.** 300-301. [Summaries in English and French : abst. from orig.]

I. Experimental vaccination of cattle with BCG has been carried out over a period of eight years and the resistance of these animals when exposed to natural sources of tuberculosis infection has been determined. In cattle up to 18 months old vaccination appeared to confer some resistance to infection. In cattle over two years old tuberculosis was present in both the control and the vaccinated animals. Generalized tuberculosis, however, was found to a greater extent in unvaccinated animals (53 per cent.) than in vaccinated animals (26 per cent.). In cattle aged between two and a half and four and a half years, no greater resistance was found in the vaccinated than in the unvaccinated animals. The conclusions reached are that, whilst BCG vaccination may increase the resistance to tuberculosis infection in early life, it has not been possible to demonstrate a true lasting immunity by this method of vaccination.

On the biological examination of 145 BCG cultures, six were proved to be virulent for guinea pigs. These were capable of causing a progressive tuberculosis. By growing these strains on special bile potato media for several years, they

gradually lost their virulence and now they are unable to produce progressive tuberculosis in laboratory animals.

II. The author points out that varying opinions are held as to the beneficial effect of using BCG vaccination in the prevention of bovine tuberculosis. The new French law (July, 1933) concerning the control of bovine tuberculosis has not made BCG vaccination compulsory. Before such a measure can be considered further work must be done since, in fact, this method of vaccination is still in the experimental stage.—J. A. Nicholson.

Andriejwski, P. (1933). Warunki niezbedne przy szczepieniu bydla metoda Calmette-Guérin'a (B.C.G.). [**Instructions for BCG Immunization in Cattle**].—*Wiadom. Wet.* **15.** 333-339. [5 refs.] [Summary in French : abst. from orig.]

BCG immunization in cattle can give good results if it is carried out immediately after the birth of the calf and if it is possible to separate the calves from the cows for 30 days after immunization ; and finally if there is opportunity to destroy all animals which have been proved to be carriers.—K. Szczudlowski (Lwów).

Rautman, H. (1933). Tuberkulosebekämpfung durch Immunisierung. [**Tuberculosis Control by Immunization**].—*Tierärztl. Rdsch.* **39.** 429-431. [Reply by Dr. Schreiber, *Ibid.* 431-432].

Rautman criticizes the method for the control of bovine tuberculosis advocated by Schreiber. He states that the value of the scheme is dependent more upon the tuberculin testing of young stock, the hygienic measures adopted, and disposal of clinical cases than on the active immunization claimed to follow the use of " novotebin."

Schreiber affirms that a definite increased resistance to tuberculosis is produced by the injection of avirulent tubercle bacilli contained in " novotebin."

—S. J. Edwards.

Agueci, A. (1933). Sulla migrazione transplacentare del bacillo di Koch. [**Placental Passage of** *Mycobacterium tuberculosis*].—*Pathologica.* **25.** 413-419. [6 refs.] [Summaries in English and German : abst. from orig.]

In order to determine whether *M. tuberculosis* can pass from mother to foetus, liquor amnii and emulsions of placental and foetal tissues were obtained from tuberculous women in the third month of pregnancy. In no case were tuberculous lesions involving the placenta observed, but in two cases 2 c.c. of liquor amnii injected into the peritoneum of guinea pigs produced progressive tuberculosis. The author considers that *M. tuberculosis* is sometimes able to pass across the placenta, either because the defensive mechanism of the latter is injured, or because there is vasodilation, stasis of the placental circulation and diapedesis of leucocytes carrying *M. tuberculosis*.—J. A. Nicholson.

I. Nasta, M. (1933). La réinfection avec des mélanges de Bacilles de Koch et de tuberculine, comme méthode d'analyse du mécanisme de l'immunité dans la tuberculose. [**Reinfection with a Mixture of Tubercle Bacilli and Tuberculin as a Method of investigating the Mechanism of Immunity in Tuberculosis**].—*C. R. Soc. Biol. Paris.* **112.** 1019-1020.

II. Balteanu, I., Toma, A., & Garaguli, Ana. (1933). La réinfection par voie ganglionnaire chez le Cobaye. [**Tuberculous Reinfection in the Guinea Pig through the Lymphatic System**].—*Ibid.* 1435-1438. [4 refs.]

III. Sewall, H., de Savitsch, E., & Butler, C. (1932). **The Nodules of**

Experimental Tuberculosis in the Guinea Pig and their Relations to Immunity].—*Amer. Rev. Tuberc.* **26.** 1-51. 4 figs., 5 tables. [37 refs.]

I. Nasta carried out experiments to assess the relative importance, in preventing tuberculous reinfection, of the elimination of the bacilli through an induced abscess and of the lysis of the bacilli as the result of the early inflammatory reaction. Guinea pigs inoculated at the same time and with the same dose of tubercle bacilli were reinoculated a month and a half later in one flank with two intradermal doses of tubercle bacilli suspended in normal saline, while in the outer flank they received two similar doses of bacilli suspended in diluted tuberculin. The inoculation of the bacilli alone resulted in the formation of a small abscess whereas the bacilli plus tuberculin gave rise to an intense inflammation followed by necrosis.

II. The authors have observed that, in tuberculous guinea pigs reinfected by inoculation into the cervical lymphatic glands, there is a progressive alteration and destruction of the majority of the bacilli. These are first broken up and then lose their acid-fastness ; this is followed by transformation into various sized granules which are at first acid-fast, but gradually lose this property.

III. This is a study of the artificially induced primary nodule of tuberculosis, with an interesting discussion on infection and the defences of the body against infection.—T. M. Doyle.

Lotze, H. (1933). Der Tuberkelbazillennachweis im Blut. [**The Demonstration of Tubercle Bacilli in the Blood**].—*Zlb. Bakt. I.* (*Orig.*). **127.** 481-486. 1 table. [70 refs.]

This article contains a very long list of references to articles by workers who have attempted to cultivate tubercle bacilli direct from the blood stream.

Using Löwenstein's method for testing culturally the blood of 20 cases of infective polyarthritis, no tubercle bacilli were isolated. [It has been suggested that many contradictory reports concerning the isolation of acid-fast organisms have arisen from the common occurrence in tap-water and in the encrustations on taps of an acid-fast organism superficially resembling *Mycobact. tuberculosis*. The use of tap-water for emulsifying material for microscopic examination opens a wide field for error].—E. J. Pullinger.

Dieckmann, H., & Mohr, H. (1933). Der Gasstoffwechsel von Tuberkelbazillen. II. Mitteilung : Der O_2-Verbrauch von Tuberkelbazillen in Abhängigkeit von physikalisch-chemischen Umweltsbedingungen. [**Gas Metabolism of Tubercle Bacilli. II. Oxygen Consumption**].—*Zlb. Bakt. I.* (*Orig.*). **129.** 185-216. 3 figs., 7 tables. [34 refs.]

The oxygen consumption of tubercle bacilli has been determined by the Warburg technique. In the presence of ammonium acetate it is shown to be dependent upon the pH and upon the concentration of the salt. There is an optimum absorption of oxygen at pH 6·2 to 6·4 and a second maximum about pH 8·0. Between these two points the oxygen absorption is somewhat lessened. Below pH 6·2 and above pH 8·0 the oxygen utilization falls off rapidly. The causes of the maxima are discussed and an explanation offered in terms of ionic dissociation, adsorption and permeabilities.—W. R. Wooldridge.

Sanarelli, G., & Alessandrini, A. (1933). Études sur l'ultravirus tuberculeux. (Deuxième Mémoire). Les protogènes du virus tuberculeux. [**Studies on the Tuberculous Ultravirus (Second Memoir). The " Protogenes " of the Virus**].—*Ann. Inst. Pasteur.* **50.** 167-221. 2 figs., 4 plates. [19 refs.]

In this account of experimental work the authors consider that they have

confirmed the existence of a cycle of evolution for the tubercle bacillus, as first described by FONTES.

Objections raised against porcelain candle filtration in the demonstration of a tuberculous ultravirus have been met by the use of collodion ultrafilters in the form of a special type of closed sac either with a single shell, or a double shell with a compartment between.

The ultravirus passes through the filter spontaneously both *in vitro* and *in vivo*. The *in vivo* results were obtained by placing the sacs in the peritoneal cavity of rabbits and guinea pigs. The ultravirus possesses only feeble pathogenicity and does not give rise to specific tuberculous nodules, though the presence of a superimposed bacterial infection may aggravate its effects and enable it to produce a fatal result. The ultravirus which passes into the outer chamber may develop into bacterial forms which are the progenitors of the tubercle bacillus. To these initial forms the authors have given the name " protogènes tuberculeux." Appropriate media sown with these initial forms develop typical cultures of tubercle bacilli which by re-sowing or by passage through animals rapidly acquire pathogenic properties.—S. H. GAIGER.

HALLMAN, E. T., & WITTER, J. F. (1933). **Some Observations on the Pathology of Johne's Disease.**—*J. Amer. Vet. Med. Ass.* **83.** 159-187. 23 figs., 2 tables. [25 refs.]

Although Johne's disease has been reported from at least 27 states in America and promises to become one of the chief menaces to the cattle industry, its slowly progressive and non-spectacular features have curbed the interest of all but a few workers, and consequently the technical journals show a dearth of literature on the subject. Such contributions as have been made have been chiefly concerned with the diagnosis and control of the disease and the relative value of johnin and avian tuberculin as diagnostic agents.

In discussing the pathology of the disease the writers give credit to HASTINGS, BEACH, MANSFIELD, TWORT, INGRAM, BANG, M'FADYEAN and others, and particularly refer to M'FADYEAN'S studies in connection with the histology of the disease and the similarity of the development of the Johne's disease lesion and that of the tubercle up to the stage where necrosis begins.

The observations reported in this paper are based upon the study of material obtained from 19 animals out of a herd of approximately 150 cattle. Three animals having died with definite lesions of the disease, 147 head were tested with avian tuberculin. Twenty-seven head gave a thermal reaction to the test, and of these 16 had been slaughtered and studied at the time of writing. All of these showed lesions " associated with acid-fast bacilli." Two non-reacting animals were also killed and no evidence of infection could be found.

The technique used in examining these animals is described, and it is claimed that, if proper methods are employed, the lesions in sections may easily be recognized and may be singled out and examined for acid-fast rods. Lesions were found in the caecum of eight animals, in the colon of eight, and in the rectum of five. Extensive lesions occurred in only two animals, neither of which gave clinical signs of the disease, and only one of which showed classic folding and corrugation of the folds. The typical early intestinal lesion is described as a small oval or linear, slightly raised, glistening area of a pinkish-grey to reddish or occasionally steel-grey colour, located on the crests of the folds. No diagnostic lesions were observed in the lymph nodes, except possibly oedema and slight mottling of the cortex.

Suggestions are advanced to explain the mode of entrance of Johne's bacillus into the tissues, its phenomenal multiplication and its transportation through the

lymphatics. In the data presented there is no positive correlation between the extent and number of the lesions and organisms found and the physical condition of the animal.—Ll. E. W. Bevan.

Abadie, P. (1932). Contribution à l'étude de la maladie caséeuse du mouton. [**A Contribution to the Study of Caseous Disease in Sheep**].—*Thesis for Docteur vétérinaire, Toulouse.* pp. 46. [36 refs.]

Under this title, the author describes the conditions of caseous lymphadenitis and caseous broncho-pneumonia or pseudo-tuberculosis, which he considers are not distinct diseases, but localized forms of a caseous disease of sheep which has long been recognized.

The subject is treated under the following headings :—aetiology, symptoms, lesions, diagnosis and treatment.

Three forms of the condition are described, one in which the lesions are cutaneous, a second form which presents lesions in the lymphatic glands and a third in which the lesions are found in the viscera.

The cutaneous form is the commonest and is caused either by the Preisz-Nocard bacillus, the coccus described by Aynaud in 1922, or a mixed infection of these two organisms. Coccal infections are more prevalent in lambs.

The lymphatic gland and visceral forms are invariably due to Preisz-Nocard infection.

Under the section devoted to prophylactic treatment, the author states that Carré's method of vaccination arrests the progress of the disease.

—Gwilym O. Davies.

Cerruti, C. (1933). Sull' azione della bile sul bacillo del mal rossino. [**The Action of Bile on the Swine Erysipelas Bacillus**].—*Nuova Vet.* **11.** No. 5. 27-37. 4 tables. [5 refs.]

The author found that when *Erysipelothrix rhusiopathiae* is grown in a broth medium to which 25 per cent. sterilized ox bile has been added, certain morphological and other changes are produced in the bacillus. In this medium the organism appears as long Gram-negative filaments. The typical Gram-positive appearance returns, however, on subcultivation in plain broth. This occurs even after 20 or 30 passages through bile broth. Intravenous injection of bile broth cultures into rabbits showed that the bacillus had lost some of its virulence, and on subcutaneous injection the cultures appeared to be non-pathogenic. The attenuating action of bile was also seen when this substance was added to 48-hour plain broth cultures and the mixture allowed to stand at 37°C. for 10 to 13 days. A vaccine prepared from cultures grown in bile broth was able to produce a solid immunity in rabbits, and the serum from these animals was able to protect other rabbits from a certain fatal dose of *E. rhusiopathiae* grown on plain broth.—J. A. Nicholson.

Lemierre, A. (1933). Transmission du rouget du mouton à l'homme. Valeur diagnostique de l'intradermo-réaction. [**Human Infection with Erysipelas of Ovine Origin. Diagnosis by an Intradermal Reaction**].—*Bull. Acad. Méd. Paris.* **109.** 59-62. [6 refs.]

In the opinion of the author, the demonstration that sheep are not uncommonly affected with *Erysipelothrix rhusiopathiae*, suggests that they may be a possible source of danger to man. He describes a form of localized erysipelas in a butcher, resulting from an injury to a hand with a splinter of bone from a sheep. *E. rhusiopathiae* was recovered in culture.

Nineteen days after recovery, an intradermal injection of an antigen prepared

from the dried organisms by Besredka's method of endotoxin extraction, yielded a clear-cut dermal reaction.—R. E. Glover.

Hinshaw, W. R., & Taylor, T. J. (1933). **A Chronic Carrier of Fowl Typhoid of Turkeys.**—*J. Amer. Vet. Med. Ass.* **82.** 922-926. 1 fig., 1 table. [5 refs.]

This appears to be the first published record of chronic ovaritis in a turkey caused by *Salmonella gallinarum* [*Bact. sanguinarium*]. The bird, a Bourbon red turkey aged two years, had recovered 18 months previously from an acute attack of fowl typhoid which had proved fatal to approximately half a flock of 300. Following this attack the bird had reacted to the agglutination test until its death. *Post-mortem* examination revealed ovaritis of the type associated with pullorum disease of the ovary in fowls from which *Bact. sanguinarium* was isolated. Although it seemed possible that transmission of infection might occur through the egg, a cultural examination of 17 eggs laid by the bird was negative.

—Gwilym O. Davies.

I. Johnson, E. P., & Anderson, G. W. (1933). **An Outbreak of Fowl Typhoid in Guinea Fowls (Numida meleagris).**—*J. Amer. Vet. Med. Ass.* **82.** 258-259. 1 table.

II. Rettger, L. F. (1933). **Endemic Paratyphoid Infection in Turkeys.**—*Ibid.* 452-460.

I. The symptoms and lesions described are those generally found in the ordinary fowl affected with this disease. Cultures and agglutination tests were prepared, confirming the causal organism to be *Salmonella gallinarum* [*Bact. sanguinarium*].

About 30 per cent. of the birds died, but the outbreak was checked by the removal of the sick birds, and the usual measures of cleansing and disinfecting the premises were carried out.

II. The history of recurring epizootics occurring on two farms is here described. The mortality in one instance reached 12,000 (66 per cent.) during the breeding and rearing season. The highest death rate occurred before the poults were ten days old. Many of the birds were found dead in the morning. When the progress of the disease was less rapid, it was found that the poults were weak, with wings drooping and movements sluggish; diarrhoea was noted at times but was not a constant symptom. There were no definite macroscopic lesions. Congestion of the liver and inflammation of the upper portion of the intestines was noted.

From the cultural characteristics and the fermentation tests, followed by the results of agglutinin adsorption tests, the organism was found to be *Salmonella* [*Bact.*] *aertrycke*.—Norman Dobson.

Sarnowiec, W. (1933). Choroby trzody powodowane przez B. suisepticus i B. suipestifer. [**Diseases of Swine caused by** *Past. suiseptica* **and** *Bact. suipestifer*].—*Wiadom. wet.* **12.** 1-11 and 61-86. 1 table. [46 refs.] [Summary in French: abst. from orig.]

The author examined 4,259 pigs in order to ascertain the role of *Past. suiseptica* and *Bact. suipestifer* in infectious diseases of swine. On the basis of the bacteriological and clinical investigations, including a large number of *post-mortem* examinations, he draws attention to the fact that the diseases caused by *Past. suiseptica* and *Bact. suipestifer* demand for their development certain conditions, which are not understood, because these diseases do not always appear as a result of a lowering of the immunity on account of the action of other bacteria, parasites,

chemical substances, etc. Against the opinion that these infections occur spontaneously may be put forward the fact that they occur as secondary complications in the course of many pathological processes; it is not always possible, even by subcutaneous inoculations, to induce an experimental infection with highly virulent cultures. There are also many uncertainties about the spread of infection and, above all, these diseases die out spontaneously. In the case of both *Past. suiseptica* and *Bact. suipestifer* there is variation in the virulence of strains. The breed of pig and the virulence of the genuine organisms have an important effect on the spread of swine septicaemia and swine plague. The milk of sick feverish sows predisposes the suckling pigs to the diseases due to *Past. suiseptica* and *Bact. suipestifer*.—K. Szczudlzowski (Lwów).

van Goidsenhoven, C. (1933). Pasteurellose et broncho-pneumonie enzootique du porc. [**Pasteurellosis and Enzootic Broncho-Pneumonia of the Pig**].—*Ann. Méd. vét.* **78.** 97-105.

The author discusses the conditions comprised in the term " maladies rouges." He suggests that the term " infectious pneumo-enteritis " should be discontinued as it embraces pasteurellosis, paratyphoid and swine fever, each of which is aetiologically distinct. Paratyphoid or salmonellosis, corresponds to what was known as infectious enteritis and is relatively common, moderately contagious and chiefly affects suckling pigs. Swine fever is a virus disease usually complicated by pectoral pasteurellosis or intestinal salmonellosis or both. Pasteurellosis corresponds in part to what was called contagious pneumonia. It is a rare affection and may be sporadic and enzootic. Frequently it is confused with enzootic broncho-pneumonia.

The author recognizes a peracute or septicaemic, an acute or pectoral, and a chronic pasteurellosis and says that diagnosis is difficult. The pasteurella is present in abundance and in pure culture in the blood and all the organs. The pectoral form is characterized by a croupous and often necrotic inflammation of the base of the lung.

Enzootic broncho-pneumonia occurs in animals kept in unhygienic surroundings. It is a mixed bacterial infection, the organisms remaining localized in the affected lung tissue. The presence of pasteurella organisms in such cases does not justify a diagnosis of pasteurellosis, a term which should be reserved for generalized infections.—S. H. Gaiger.

Acevedo, R. A. (1933). **A Study in P. avicida Antigens, for the Purpose of producing a Vaccine against Fowl Cholera.**—*Gaz. Bureau Anim. Indust. Philippine Is.* **3.** 140-147. 6 tables. [2 refs.]

The protective value of a vaccine prepared by the formalinization of seven-day cultures (40° to 42°C.) of *Past. aviseptica* was tested in mice. Approximately 75 per cent. of the vaccinated animals resisted the test dose. [The M.L.D. is not indicated]. It is suggested that, as in the case of *Past. pestis*, a heat-labile capsular substance was mainly responsible for the immunological response. A small-scale field trial was undertaken in an infected flock of fowls with promising results.—R. E. Glover.

Truche, A., & Bauche, J. (1933). Le bacille pseudo-tuberculeux chez la poule et le faisan. [**Bacillus of Pseudo-Tuberculosis in Fowl and Pheasant**].—*Bull. Acad. vét. France.* **6.** 43-47. [4 refs.]

The authors have previously recorded the finding of the bacillus of Malassez and Vignal in the turkey, duck and canary, and now record the finding of the same organism in the fowl and pheasant.

The fowl came from a flock of 50 birds which showed indefinite symptoms of illness, and in which there were ten deaths. One of the dead birds was brought for *post-mortem* diagnosis. A clear albuminous fluid surrounded the trachea, oesophagus and crop. The heart showed atrophy and the pericardial fluid was gelatinous. The intestine showed discrete lesions of enteritis with minute petechial haemorrhages on the mucosa. The kidneys were greatly hypertrophied, especially the anterior lobe, with small nodules scattered over the surface. Examination of liver, spleen, kidney and blood by the microscope did not reveal anything in particular. Cultures from these sources on ordinary bouillon yielded, in 24 hours, characteristic cultures of the bacillus of pseudo-tuberculosis. The serum of the fowl was tested against a suspension of the bacillus of turkey origin and gave positive agglutination results up to a dilution of 1 : 500.

The pheasant came from a pheasantry in which three or four birds had been found dead in the space of eight days. Here again positive cultural and agglutination results were obtained.—S. H. Gaiger.

Karsten. (1933). Erfahrungen und Betrachtungen über die Enteritis-Gärtner-Infektion des Rindes. [**Enteritis of Cattle caused by** *Bact. enteritidis*].—*Arch. wiss. prakt. Tierhlk.* **66.** 189-202. 1 fig. [3 refs.]

The author gives a long account of his own experiences and those of other workers of infection of both calves and adult cattle with *Bact. enteritidis* (Gärtner's bacillus). It appears that in both calves and cattle the disease has much in common as regards the clinical and pathological findings. There is, however, a difference in the severity of different outbreaks and this would tend to make diagnosis somewhat difficult, especially as the disease appears sometimes without any noticeable symptoms. In regions where the disease is common, calves and, to a less extent, cattle may become carriers of the infecting organism. These animals and also those which show slight pathological changes may be recognized by the isolation of the infecting organism from the gall-bladder. Further research must be carried out in order to determine whether the cases which occur without noticeable symptoms can be similarly diagnosed. The author makes a plea for the bacteriological examination of the contents of the gall-bladder of all emergency-slaughtered calves and cattle.—R. Lovell.

Junack, M. (1933). Zur Nomenklatur, Diagnostik und Beurteilung der Gärtnerbazillose des Kalbes und der übrigen Fleischvergifterinfektionen des Rindes. Zur Technik und Indikation der bakteriologischen Fleischuntersuchung. [**Nomenclature and Diagnosis of Gärtner Infection of Calves and of the other Meat-Poisoning Organisms**].—*Berl. tierärztl. Wschr.* **49.** 430-432. [14 refs.]

Macroscopic evidence of infection of a carcass comprises swelling of the liver, spleen and kidneys, multiple hepatization in the lungs, foci in the liver, congestion of the kidneys and icterus of the conjunctiva. The different tissues show changes in a varying proportion of the carcasses examined.

Organisms of the Gärtner type [*Bact. enteritidis*] were usually isolated and were identified by the use of a type-specific serum. [It is not clear whether an attempt was made to distinguish the Gärtner type from closely allied types such as those of Dublin, Moscow or Dar-es-Salaam].—E. J. Pullinger.

I. Slagsvold, L. (1933). Griseparatyfus. [**Pig Paratyphoid**].—*Norsk Vet.-tidsskr.* **45.** 433-443 and 468-480.

II. —. (1933). Svineparatyfus. **[Swine Paratyphoid. New Decree concerning Norway].**—*Ibid.* 503-504.

I. The author gives first a general view of paratyphoid in pigs in other countries, among others including the Danish type, and states that paratyphoid is caused by different variants.

He then gives a description of the first big outbreak in Norway. It concerns a large piggery in a suburb of Oslo. Here no breeding is carried on but young pigs are bought for fattening. The sanitary conditions are fairly good. Between 200 and 300 pigs died in the spring and winter of 1933 and some recovered after ailing for a long time.

The symptoms, the course and the pathological-anatomical picture did not differ from the Danish swine paratyphoid described by Adsersen [this *Bull.* **4.** 13 and (1930-1931). *Maanedsskr. Dyrl.* **42.** 33-42, 65-87, 114-125 and 132-158].

Bacteriological examination showed paratyphoid bacteria, identical to those isolated in Denmark, to be present : they were found to be very virulent for mice, guinea pigs and rabbits ; in pigs they produced a typical progressive paratyphoid infection. Swine fever was excluded by an appropriate test.

Treatment is useless. Vaccination with dead bacteria does not give sure results.

The author then gives instructions as to how to eradicate the disease by hygienic arrangements.

II. The veterinary administration has compiled an order concerning swine paratyphoid. The regulation reads as follows : The owner is bound to report all suspicious cases to the veterinary or police authorities, and, if swine paratyphoid is diagnosed, the whole herd is considered to be infected, until the veterinary authorities declare it uninfected. It is forbidden to move live swine from the herd except for butchering. Dead or affected animals, as well as manure from the piggery, must be rendered innocuous. Cleaning and disinfection must be carried out according to the indications of the veterinary surgeon. Failure to comply with the regulations will be punished with fines.—L. Slagsvold (Oslo).

Kuttner, Ann G., & Zepp, H. D. (1933). **Salmonella suipestifer Infections in Man. Further Observations.**—*J. Amer. Med. Ass.* **101.** 269-272. 1 fig. [13 refs.]

In 1932 the authors recorded a series of seven cases of septicaemia in children due to *Bact. suipestifer* in which the disease was relatively mild, did not in any way simulate food poisoning, but was diagnosed by blood culture. During 1932 to 1933 four further cases were observed, three in children and one in an adult. The adult developed a septicaemia following a radical antrum operation and two of the children had arthritis, one showing osteomyelitis. The other child developed a septicaemia during broncho-pneumonia and died. *Bact. suipestifer* group II was isolated from all four cases. In no instance was an association with infected pigs established.

[Although *Bact. suipestifer* group I—diphasic—American type is generally considered to be the common type associated in America with hog cholera, in recent years, *Bact. suipestifer* group II—monophasic—western European type has with increasing frequency been associated with diseases of human beings and of pigs in America].—R. Lovell.

Smith, J. (1933). **Sporadic Infections in Aberdeen due to Food-Poisoning Organisms of the Salmonella Group.**—*J. Hyg. Cambridge.* **33.** 224-232. 2 tables. [13 refs.]

Of 46 human infections with members of the salmonella group occurring during the years 1929 to 1932, 26 occurred as single cases unassociated with others. It was only possible in this series to trace the source of infection in two outbreaks. In one of these, pressed beef was the vehicle and the Thompson type the causal organism ; in the other a cow was infected with *Bact. aertrycke*, this organism having been isolated from the milk and faeces. It was assumed that a cow which had previously been at the same farm had also suffered from infection with *Bact. aertrycke*.

The most prevalent organisms found in this series are *Bact. aertrycke* and the Thompson type. Infections due to the Dublin type and also to both the monophasic and diphasic types of *Bact. suipestifer* were also encountered.—R. Lovell.

Schmidt, W. (1933). Zur Praxis der Abortusbekämpfung (Banginfektion) in Rinderherden. I. Mitteilung. II. Mitteilung : Impfung mit lebenden Kulturen. III. Mitteilung : Impfung mit Farbimpfstoff Weichlein. IV. Mitteilung : Vaginale Concipinbehandlung. Lymphomatosis maligna und Abortus Bang. [**Control of Contagious Abortion. Part I. Part II. Use of Live Vaccine. Part III. Use of Weichlein's Inoculum. Part IV. Vaginal Treatment with " Concipin." Malignant Lymphomatosis and Contagious Abortion**].—*Tierärztl. Rdsch.* **39.** 611-614, 645-648, 659-662 and 674-677. 11 tables. [52 refs.]

The author discusses methods of infection and the development of immunity against contagious abortion. The inoculation of living *Br. abortus* culture into cows and heifers belonging to three herds, four to six weeks before service, was followed by an increase in the abortion rate and in the incidence of sterility during a period of four years observation. Favourable results followed the inoculation of dye culture (Weichlein), which could be safely used on pregnant cows. It is difficult, however, to assess the immunizing value of this method since hygienic measures were also adopted in the herds under test. An antiseptic named " concipin " is recommended for irrigating the uterus of infected cows ; this apparently has the effect of reducing the agglutination titre of the blood.

—S. J. Edwards.

I. Bisanti, C. (1933). Les Brucelloses. [**Brucellosis**].—*Bull. Off. internat. Epiz.* **7.** 67-72. 1 map.

II. Zeller, H. (1933). Résultats des recherches les plus récentes sur les *Brucella* et les *Brucelloses*. [**A Review of Recent Investigations on Brucella and Brucellosis**].—*Ibid.* 73-156. 4 tables. [1 ref.]

III. Zeller, H. (1933). Étude des Brucelloses. [**Study of Brucellosis**].—*Ibid.* 289-297.

I. This is a brief survey of established facts concerning the pathogenicity of brucella for animals and man.

II. This is a comprehensive survey of recent work carried out on brucellosis. Zeller considers that live abortion vaccine should be used only on heavily infected herds and that the milk of inoculated animals should be pasteurized before use.

III. This is a résumé of the second article.—T. M. Doyle.

Haupt, H. (1933). Zur Bekämpfung des seuchenhaften Verkalbens auf Grund der Epizootiologie der Abortusbruzellose des Rindes. [**The Fight against Contagious Abortion based on the Epizootiology of *Br. abortus* of Cattle**].—*Tierärztl. Rdsch.* **39.** 857-861. 1 fig. [2 refs.]

Haupt points out that the eradication of bovine contagious abortion is aimed

at not only for reasons of agricultural economy, but also on public health grounds, as milk and milk products are suspected of producing undulant fever in human beings.

Haupt describes the course of infection and shows how it differs according to the age and sex of the infected cattle. By means of a diagram he shows the source and seat of infection, its means of dissemination and its termination. As infected uterine contents spread infective material throughout the stable, the eradication of contagious abortion is impossible unless an isolated calving box is used for every calving, whether normal or otherwise, and rigidly disinfected after use. Epizootiologically, the most serious infections are infections of the udder, for they last the longest and in more than 50 per cent. of cases give rise to reinfection of the uterine contents and so to the spread of enormous quantities of bacilli.

Haupt is definitely against inoculation with living cultures (except possibly in the case of very young animals), until further experiments have proved absolutely the safety of the method.—F. Bullock.

Magnusson, H. (1933). Le bacille de l'avortement de Bang et les hygromas des bovidés. [*Br. abortus* **Infection and Hygromata of Cattle**].—*Rev. gén. Méd. vét.* **42.** 465-485. 2 figs., 4 tables. [14 refs.]

For many years Magnusson has noticed that in herds in which cattle are infected with epizootic abortion, hygromas are more common than in herds not so infected. Also serological tests have shown that animals suffering from bursitis are sometimes infected with abortion. Indeed, cattle with hygromas possess in their blood a higher agglutinating power against *Br. abortus* than other cattle.

Of 203 bovines with hygromas, 79 (39 per cent.) gave a positive reaction, whereas of 1,055 bovines from the same district and of the same age, but free from hygromas, there were only 122 (12 per cent.) showing agglutinins against *Br. abortus*.

Magnusson does not regard the brucella as the cause of the hygroma, but believes that the hygroma, like the udder, may constitute a " reservoir " for the brucella.—Ll. E. W. Bevan.

van der Hoeden, J. (1932). Mededeelingen van de Brucella-Bang Commissie. No. 3. Over het Verband tusschen Brucella-Bang en de zoogenaamde kniebuilen bij koeien. No. 4. Over Brucella-Infecties bij Paarden. No. 5. Over spontane en experimenteele Brucella-Infectie bij den Hond. [**Committee on Contagious Bovine Abortion. No. 3. The Influence of** *Br. abortus* **infection on the cause of Hygroma in Cows. No. 4.** *Br. abortus* **Infections in Horses. No. 5. Brucella Infection in Dogs**].—*Tijdschr. Diergeneesk.* **59.** 385-387, 612-620 and 1446-1460. 3 tables. [14 refs.] [Summaries in English, French and German : abst. from orig.]

3. An extensive investigation was made of *Br. abortus* infection in cattle, horses and dogs.

The contents of knee hygromas of eight cows were examined ; in three cases *Br. abortus* was found in the fluid. Agglutinins were found in five cows and complement-fixing antibodies against *Br. abortus* in seven ; in two cases no agglutinins were found, but amboceptors were present ; in one case both were absent. The blood serum of three cows contained agglutinins and complement-fixing antibodies. It has not been definitely ascertained if *Br. abortus* is the cause of hygroma.

4. Horses which were experimentally infected perorally with *Br. abortus* quickly produced agglutinins and complement-fixing antibodies, with or without fever. Infected horses gave an allergic reaction after subcutaneous injection of a

killed culture. An ophthalmic reaction using a killed brucella suspension proved reliable in diagnosis.

5. This disease is rarely reported as occurring in these animals, but in 16 per cent. of 442 dogs without clinical symptoms the blood was found positive; (agglutinins and complement-fixing antibodies); the reactions persisted for a long time in infected animals. Infection with living culture *per os*, through the skin and in the eye produced agglutinins and complement-fixing antibodies and for a long time the organism could be demonstrated in many of the internal organs.

Contact infection appears to be possible and the dog as a source of infection should not be neglected.—A. KLARENBEEK (UTRECHT).

BÜCHLI, K. (1933). Mededeelingen van de Brucella Bang-Commissie. No. 6. Abortus infectiosus (Bang) onder de runderen in Nederland. [**Communications of the Brucella Bang Committee. No. 6. Bovine Infectious Abortion (Bang) in Holland**].—*Tijdschr. Diergeneesk.* **60.** 125-130. [Summaries in English, French and German: abst. from orig.]

A systematic research on the occurrence of *Br. abortus* infection in Holland has shown that the disease has spread all over the country, occurring in about 40 per cent. of the farms. In many farms the infection is slight and about 8 per cent. of the cows abort yearly. The losses amount to 4 million guilders yearly. —A. KLARENBEEK (UTRECHT).

I. MIESSNER, H., & KÖSER, A. (1933). Die Bruzellose des Schweines und die Biologie der Brucella abortus. [**Swine Brucellosis and Biology of** *Br. abortus*]. —*Deuts. tierärztl. Wschr.* **41.** 308-313. 3 figs., 3 tables. [53 refs.]

II. MAKKAWEJSKI, W. N., KARKADINOWSKAJA, I. A., & MICHEEW, N. I. (1933). Ueber den infektiösen Abortus (Brucelliasis) des Schweines. [**Brucellosis in Swine**].—*Ibid.* 321-327. 4 figs., 2 tables.

I. Outbreaks of abortion occurred in two herds of swine and brucella organisms were recovered from the stomach contents of four aborted foetuses. A comparison was made of their characters with those of brucella strains of human, porcine and bovine origin. A satisfactory differentiation of the three types could be made by growth on agar plates containing thionin and methyl violet and by H_2S production, those isolated having the characters of the established porcine type.

Brucella infection of swine is a disease of rare occurrence in Germany and can be eradicated fairly readily from infected herds.

II. Contagious abortion of swine caused by *Br. suis* Traum [the porcine type of *Br. abortus*] was observed in four large herds in Russia. In these herds it was found that in the pig the infection produced a disease which was manifested by a number of different clinical conditions apart from abortion. The conditions most frequently noticed were:—sterility, orchitis leading to impotency of the boar, abscesses, mastitis and occasionally metritis.

The pathological changes commonly associated with the disease were:—lymphadenitis with discolouration of the maxillary and mesenteric glands with multiple abscess formation, synovitis, abscesses and degeneration of muscles, spleen, liver and testicles. Of 5,112 swine examined by the agglutination test, 2,345 gave a positive reaction in a titre of 1 : 100 or over; frequently it was found that agglutination did not occur in high serum concentrations. Agglutinins were not found in the blood of young pigs of reacting sows.—S. J. EDWARDS.

HAPPE, H., & NEUMARK, E. (1933). Ueber die Verbreitung der Bang-Infektion bei Mensch und Rind in Berlin. [**The Extent of** *Br. abortus* **Infection in Man and Cattle in Berlin**].—*Zlb. Bakt. I.* (*Orig.*). **128.** 342-352. [31 refs.]

From October, 1929, to September, 1932, 43 cases of undulant fever were diagnosed in Berlin, 31 cases occurring in men and 12 in women. In most of these cases infection was attributable to the drinking of raw milk. During the same period an examination of the blood sera of 804 people for the presence of specific *Br. abortus* agglutinins showed that 14 (1·7 per cent.) reacted (a titre of 1 : 100 being regarded as positive). These figures show that *Br. abortus* infection in man is not so prevalent in Berlin as in other districts in Germany, and the authors consider that this is due to the fact that the bulk of the milk consumed in the raw state is produced from commercial dairy herds kept in Berlin, which are particularly free from brucella infection. The greater proportion of other milk sold is pasteurized.—S. J. EDWARDS.

I. STOCKMAYER, W. (1933). Kommt die Bang'sche Krankheit (Brucellose) auch bei Hühnern vor ? [**Does** *Br. abortus* **Infect Fowls ?**]—*Arch. Geflügelk.* **7.** 276-282. [2 refs.] [Summary in English : abst from orig.]

II. BELLER, K., & STOCKMAYER, W. (1933). Die Pathogenität der Bangbazillen (Brucella abortus) für Hühner und Kücken unter natürlichen Bedingungen. [**The Pathogenicity of** *Br. abortus* **for Fowls under Natural Conditions**].—*Deuts. tierärztl. Wschr.* **41.** 551-553. 4 tables. [14 refs.]

I. This article is a restatement of the findings of BELLER and STOCKMAYER [this *Bull.* **4.** 97.] regarding the pathogenicity of *Br. abortus* for the fowl. Hens can only be infected with *Br. abortus* when relatively large doses of culture are administered : repeated dosage is necessary when culture is given orally. There are no apparent clinical symptoms and the pathological changes are limited to slight enlargement of the spleen. It appears to be only possible to recover the organisms up to three weeks after the time of inoculation. Agglutinins appear in the blood after four days and may persist for a period of one and a half years. Chickens are not more susceptible than adult fowls.

II. The authors succeeded in demonstrating the production of specific *Br. abortus* agglutinins in the blood of hens fed with the foetal membranes of an aborted cow.—S. J. EDWARDS.

THORP, F., JR., & GRAHAM, R. (1933). **The Persistence of Brucella Agglutinins in Calves of Reactor Cows.**—*J. Amer. Vet. Med. Ass.* **82.** 871-874. 1 table. [3 refs.]

The authors tested, at monthly intervals, the blood of 173 calves for the presence of *Br. abortus* agglutinins. The first test was made 4 to 48 hours after birth. The calves were allowed to suckle their dams for five to seven days and were then fed on pasteurized milk. During a period of five years 118 calves were born to 89 non-reacting cows, 49 calves to 23 positively reacting cows and six calves to four suspicious reactors. All the 118 calves, the progeny of the non-reactors, gave a negative reaction at birth and remained negative. Of the 49 calves from positive cows, 21 were positive at the initial test and 28 were negative. Four of the six calves from the suspicious reactors were negative at the initial test and two were positive.

All the positively reacting calves became negative within six months or less.

—T. M. DOYLE.

I. White, G. C., Johnson, R. E., Plastridge, W. N., & Reece, R. P. (1933). **Bovine Infectious Abortion (Twelfth Report). A Study of Agglutination Reactions in the Diagnosis of Bang's Abortion Disease.**—*Storrs Agric. Expt. Sta. Bull.* No. 185. pp. 15. 2 tables. [3 refs.]

II. Donham, C. R., & Fitch, C. P. (1933). **A Method for the Preparation of Antigen for the Rapid Agglutination Test for Bang's Disease with a Technic for Conducting such Test.**—*J. Amer. Vet. Med. Ass.* **82.** 913-921. 3 figs., 1 table. [8 refs.]

I. Details are given for carrying out and interpreting the agglutination test for the detection of carriers of *Br. abortus*. The authors believe that the 1 : 25 dilution should be omitted when carrying out routine tests as, in their experience of testing over 6,000 blood samples, slight reactions occurred in this dilution in 25 per cent. of samples.

Animals that have given positive reactions over a period of months should not be returned to the healthy herd if they cease to react to the test.

II. It is the custom to standardize antigens for the rapid agglutination test by comparing the results with those obtained by the test tube method. The authors have pointed out in previous publications [this *Bull.* **3.** 124.] certain objections to this procedure.

They now describe a technique for standardizing rapid test antigens which, although admittedly imperfect, is claimed to be a considerable improvement on the existing method.

The *Br. abortus* cultures are suspended in a solution containing 0·85 per cent. sodium chloride and 0·5 per cent. phenol [instead of in the customary 12 per cent. sodium chloride].

After centrifuging the suspension, the bacteria are resuspended in a 0·85 per cent. solution of sodium chloride containing 0·4 per cent. gelatine. The bacterial concentration is then adjusted by means of capillary centrifuge tubes to between 10 and 12 per cent. by volume of the bacterial suspension. Full details of the technique are given.

The authors recommend that the tests should be allowed to stand for at least eight minutes before taking the final reading.—T. M. Doyle.

Viriden, P. (1933). Förutsättningar för utrotningskriget mot nötkreaturens smittsamma kastning med hjälp av regelbundet upprepade blodundersökningar. [**The Conditions Necessary for Successful Eradication of Bovine Contagious Abortion, with the Assistance of Regularly Repeated Blood Tests**].—*Skand. Vet.-tidskr.* **23.** 194-199. 2 tables. [Summary in English : abst. from orig.]

The chief conditions necessary for the control and eradication of contagious abortion are rigid segregation of both infected and healthy animals, and blood tests of every animal in the herd at monthly intervals until the whole are negative to two successive tests.

The writer gives an account of failure to eradicate the disease from four herds, three of which were newly infected.

Reinfection occurred during the grazing season, at which time segregation was difficult if not impossible, and all the animals in the herd could not be tested. Contagious abortion is more easily combated during the winter when all animals are housed.—A. A. Forsyth.

I. Zeynelabidin, H. (1933). Prüfung der Schnellagglutination für die Diagnostik des infektiösen Abortus des Rindes. [**The Rapid Agglutination**

Method for the Diagnosis of Contagious Abortion].—*Deuts. tierärztl. Wschr.* **41.** 388-391. 4 tables. [11 refs.]

II. Welch, H., & Mickle, F. L. (1933). **Further Studies on a Comparison of the Huddleson Slide Test with the Macroscopic Tube Test in Undulant Fever.** —*J. Lab. & Clin. Med.* **18.** 627-636. 3 tables. [9 refs.]

I. As a result of preliminary experiments which are detailed, the test suspension (which was standardized but whose actual density is not given) was made up in 10 per cent. saline and 0·05 of this was mixed with a single volume, 0·025, of serum on a plate kept at 22° to 25°C.

Using this technique 446 sera were tested by the rapid slide method and the results compared with those of the more usual slow method in tubes. The results were in agreement in the case of 93 per cent. of 128 sera which gave complete agglutination at 1 : 100 to 1 : 800 by the tube test, and 97 per cent. of 238 fully negative sera. Greater discrepancies were found with sera which gave partial agglutination at 1 : 100 or below in the tube test. The author concludes that the rapid method cannot replace the usual tube method.

II. From a comparison of the rapid method described by Huddleson with the more usual tube method in the case of 763 human sera, in which 50 per cent. agglutination at a titre of 1 : 300 was regarded as positive, it is concluded that the rapid method is an accurate and efficient means of diagnosing brucella infection in human beings. Fewer questionable reactions were obtained than with two tube methods tried.

A series of cases is given, mostly from a school, in which a high agglutination titre was shown, although no symptoms of undulant fever were present. The authors suggest that brucella infection in children and young adults is milder than in older groups, and may not be attended by the classical symptoms.

—A. W. Stableforth.

Donham, C. R., & Fitch, C. P. (1933). **Agglutination Tests in the Diagnosis of Infectious Abortion in Cattle (Bang's Disease) with Special Reference to the Rapid Test.**—*J. Infect. Dis.* **53.** 98-124. 2 figs., 2 tables. [18 refs.]

The writers, aided by a grant from the Bureau of Animal Industry of the United States Department of Agriculture, have carried out experiments with a view to determining the sensitivity of rapid test antigens and to evolving a more satisfactory technique for their preparation and standardization.

The addition of acacia to the antigen used for the test tube method resulted in increased sensitivity of the antigen and a similar phenomenon was observed in rapid test antigens. In the same way the addition of gelatin to antigen for the rapid test usually resulted in increase in the titres of sera tested as compared with the results obtained in tests with antigen to which no gelatin had been added. This, however, was not always found to be the case.

The effects of other materials on the sensitivity of *Br. abortus* antigen in the rapid test were determined and the influence of varying concentrations of electrolytes upon the rapid test was ascertained. These appeared to be identical with those occurring in the test tube method. It was found that the results did not occur in the complete absence of electrolytes. Heating *Br. abortus* antigen did not exert any significant influence on its sensitivity in the rapid test.

It has been recognized by other observers that accuracy in the drop method of measuring antigen in the rapid test is desirable and the writers found that the titres varied in ratio to the amounts of antigen employed. Increase in the amounts of antigen resulted in decrease in the titres, but variations of only approximately 0·005 c.c. from 0·03 c.c. amounts of antigen suspension did not result in consistent variations in titres.

An atypical clumping of rapid test *Br. abortus* antigen when mixed with certain solutions of gelatin and acacia is discussed. This occurred when 1·5 per cent. gelatin solution and 6 per cent. acacia solution were added, but use of lesser concentrations of these materials did not result in perceptible changes in the appearance of the solution-antigen mixtures. A suggested improvement in the test-box for use in the rapid test is described. The effect of the size of tube on results obtained with the test tube method is said to be of no significance and within the limit of experiment error.—Ll. E. W. Bevan.

I. Huddleson, I. P., Johnson, H. W., & Hamann, E. E. (1933). **A Study of Brucella Infection in Swine and Employés of Packing-Houses.**—*J. Amer. Vet. Med. Ass.* **83.** 16-30. 8 tables. [12 refs.]

II. McIlnay, J. N. (1933). **Observations on the Epizootology of Bang's Disease in Swine.**—*Cornell Vet.* **23.** 279-288. [4 refs.]

I. The authors examined the blood of 3,975 pigs, by means of the rapid whole-blood agglutination test, for the presence of *Br. abortus* agglutinins. A bacteriological examination was made of the organs and lymphatic glands of those animals which showed a positive blood titre of 1 : 50. The tissues examined were spleen, liver, kidney and gastric internal iliac, supramammary mesenteric and bronchial lymphatic glands.

In order to ascertain the risk of human infection occurring from infected pig tissues a series of observations were made. It was found that keeping naturally infected tissues at a temperature of −10°F. for 30 days had little effect on the viability of the *Br. abortus*.

Commercial curing brine markedly affected the viability of the organism and it was difficult to recover it from tissues that had been immersed in brine for five days.

Examination of blood from 167 employés in packing-houses showed that 10·7 per cent., according to the agglutination test, or 23·9 per cent., according to the opsono-cytophagic test [to be described in a future publication] had been exposed to brucella infection during the handling of infected pig tissues.

II. McIlnay describes a serious and widespread outbreak of abortion among swine in Nebraska caused by the porcine strain of *Br. abortus*.

In some herds over 60 per cent. of the sows aborted, while in other herds agglutination tests revealed a high percentage of infected animals.

—T. M. Doyle.

Leduc. (1932). Au sujet de la pathogénie de l'avortement épizootique et de la fièvre vitulaire. **[The Pathogenesis of Contagious Abortion and Milk Fever].**—*Bull. Soc. vét. prat. Paris.* **16.** 163-167 and 225-229. [A discussion which took place at two meetings of the Société Vétérinaire Pratique de France to which a number of speakers contributed].

Leduc attacked the current conceptions of the pathology of milk fever and contagious abortion. Arkwright cited his experiences of the successful use of calcium in milk fever. Davesne defended the current theories and went on to quote the work of various authors on the influence of mineral metabolism on resistance to bacterial infection.—George Slavin.

Zeller, H., & Stockmayer, W. (1933). Kulturelle Differenzierungsversuche mit Bakterien der Brucellagruppe. **[Cultural Differentiation in the Brucella Group].**—*Zschr. Infektkr. Haust.* **44.** 67-80. 2 tables. [15 refs.]

The authors have examined 179 strains of brucella from various sources

according to the methods originated by Huddleson, and confirm his conclusions that, in general, the species brucella can be arranged in three groups according to their growth on liver agar containing thionin or pyronin in suitable concentrations, viz., (1) *Br. melitensis*, hardly influenced by thionin 1 : 10,000 or pyronin 1 : 50,000 ; (2) *Br. abortus* inhibited by thionin 1 : 10,000 ; (3) *Br. abortus*, porcine variety inhibited by pyronin 1 : 50,000. They note, however, that the differentiation is not always well marked and may not be in agreement with epidemiological data. For this reason they have in many cases made use of a wider series of dye concentrations, and conclude that at least two concentrations should always be used. Where the results are in doubt, the test for the production of hydrogen sulphide on 2 per cent. glycerine agar provides a useful accessory test. Most, but not all, *melitensis* strains produce no hydrogen sulphide or at least only a trace on the first day whilst most *abortus* strains, whether from bovines or swine, produce a distinctly greater amount.

Of 75 strains from cattle, 13 showed more or less similarity to *melitensis* according to the thionin test. Of these 13, four only did not produce notable amounts of hydrogen sulphide. One of these was from the Mediterranean and may well have been *Br. melitensis*, but the remaining three were isolated from foetuses aborted in Germany itself, and it was therefore extremely unlikely that they were *Br. melitensis*.

Of 22 strains from swine, 18 strains (11 from America, one from Denmark five out of seven from Hungary and one out of three from Germany itself) grew well on thionin but not on pyronin. Two strains grew, however, equally well on both and two better on pyronin.

Of 36 strains of *Br. melitensis* from Italy or other Mediterranean countries, six strains were somewhat inhibited by pyronin whilst one was nearly and another completely inhibited by thionin.

Of 41 strains of brucella from human beings, 17 (all from America) had the properties of *Br. abortus*, porcine variety ; the remainder from Germany, Denmark, and America behaved like the bovine variety. Strains from a horse were also of the bovine variety.—A. W. Stableforth.

Andrews, W. H. (1933). **Vaccination against Bovine Contagious Abortion and the Relation of this Disease to Undulant Fever of Man.**—*Vet. Rec.* **13.** 1015-1039. 1 chart. [1 ref.]

The paper was presented to the 1933 (Llandudno) Congress of the Nat. Vet. Med. Ass. of Great Britain and Ireland, in continuation of the discussion on the same subject at the previous Congress [this *Bull.* **4.** 96]. It was followed by official openings from the standpoint of the practitioner, the public health official, and of the experimental pathologist, and by a long discussion. The contributions of the numerous speakers cannot, however, be satisfactorily abstracted and should be read in the original.

The subjects discussed were as follows :—the work published since the 1932 congress : vaccination with living, attenuated or dead cultures and its effects on the prevention of abortions, on sterility, on the creation of carriers (particularly as regards the milk supplies) and on the spread of the disease : the eradication or segregation policy and the necessity of bringing it to the notice of stock-owners as often and as convincingly as possible, and of putting it into operation, wherever practicable : the " closed herd " policy : the practical difficulties involved in these latter procedures : the infection of human beings and the relative parts played by raw milk, graded or ungraded, and contact infection : variations in the cultural requirements and characters of *Br. abortus* isolated in different countries, and the

apparent diversity of their virulence for human beings : the atmospheric requirements of freshly isolated strains and their use as criteria for the identification of vaccine strains : the actual results obtained in certain herds : the question of Treasury help in the eradication of the disease : and finally the need of accurate information regarding the result of vaccination and of eradication policies in the field.—A. W. Stableforth.

Dubois, C. (1933). La prémunition dans la mélitococcie ovine et caprine. [**Immunization in Ovine and Caprine Brucellosis**].—*C. R. Soc. Biol. Paris.* **113.** 823-826. 3 tables. [3 refs.]

Nine experiments are recorded of vaccination of goats and sheep affected with *melitensis* infection as indicated by abortion, serological reaction and undulant fever. The vaccine employed consisted of a suspension of a strain of *Br. abortus* P, avirulent to guinea pigs, grown for three days on agar medium, and washed off with physiological saline. Each dose consisted of 1 c.c. containing a milliard organisms, injected into the subcutaneous tissue of the tail. It was applied to six flocks, upon barren animals and also after abortion. The inoculated animals were not served until two to six months after vaccination. In two flocks, vaccination was effected during the period when a considerable number of sheep were advanced in pregnancy. The vaccination was well supported and no local or general disturbance was noted, except some slight falling off in the milk yield for 24 to 48 hours after inoculation. The vaccinated animals, even those four months pregnant, did not abort.

Tables are supplied showing the numbers of young animals born before and after treatment, a marked increase being noticeable in the latter. It would appear that the injection of living *Br. abortus* P to " empty " sheep and goats during premunition and also after the period of invasion of *melitensis*, results in the almost complete suppression of abortions, of sterility and loss of young. The injection of the same vaccine into pregnant sheep, during the period of invasion of the disease, results in a very marked diminution in the number of abortions, cases of sterility and loss of lambs.—Ll. E. W. Bevan.

I. Kitselman, C. H. (1933). **A Study of Bang Abortion Live Germ Vaccine in a Beef Herd.**—*Cornell Vet.* **23.** 309-311. 1 table.

II. Cotton, W. E., Buck, J. M., & Smith, H. E. (1933). **Studies of the Skin as a Portal of Entry for Brucella abortus in Pregnant Cattle.**—*J. Amer. Vet. Med. Ass.* **83.** 91-100. 2 tables. [6 refs.]

III. Carpenter, C. M., & Boak, R. A. (1933). **The Effect of Various Therapeutic Agents on Brucella abortus Infection in Guinea Pigs.**—*J. Bact.* **25.** 88. [Paper read at 34th Ann. Meet. Soc. Amer. Bacteriologists].

IV. Huri, M. (1933). L'antivirus de Besredka dans la prophylaxie et le traitement des brucelloses humaine et caprine. [**The Prophylactic and Curative Value of Antivirus for Brucella Infections in Man and Animals**]. —*C. R. Soc. Biol. Paris.* **113.** 988-990. [1 ref.]

I. Kitselman tested the value of live abortion vaccine on a heavily infected herd of cattle kept under typical range conditions. The vaccine was obtained from a commercial firm [no information is given regarding the preparation of the vaccine] who claimed that the blood of 95 per cent. of the vaccinated cattle would be negative at the end of a year and that a similar percentage of animals would calve normally during the period. The results obtained as regards abortion and sterility were bad and at the end of the period every animal gave a positive reaction to the agglutination test.

II. The authors record the results of experiments on the transmission of *Br. abortus* infection to bovines through abraded and through intact skin. All possible precautions were taken to avoid portals of entry other than the skin. Three in-calf heifers and one in-calf cow were successfully infected by rubbing a suspension of *Br. abortus* into a clipped and slightly scarified area of skin. The disease was transmitted to 10 out of 16 in-calf animals, 15 heifers and one cow, by applying pledgets of cotton wool moistened with suspensions of *Br. abortus* to the intact skin.

III. Carpenter and Boak carried out experiments on two groups of guinea pigs artificially infected with human and bovine strains of *Br. abortus*, to test the curative value of different chemicals, specific agents and irradiation. The following were tested :—(1) acriflavine, intraperitoneally ; (2) methyl violet *per os* ; (3) thionin *per os* ; (4) immune serum, intraperitoneally ; (5) feeding autogenous vaccine ; (6) injecting autogenous vaccine subcutaneously ; (7) deep X-ray therapy and (8) artificially induced fevers. The dyes and heat-killed vaccine appeared to be without effect. The use of immune serum, vaccine feeding and artificially induced fever brought about some improvement.

IV. Huri carried out experiments to test the value of antivirus (Besredka) against brucella infections in animals and human beings. Doses varying from 70 to 150 c.c. given to goats and sheep *per os* and *per rectum* were found to protect the animals 48 hours later against massive inoculations of virulent cultures given by any of the ordinary routes. Large doses of antivirus given several times daily for ten days are claimed to have eliminated the brucella infection from goats.

Antivirus was found to be very effective in the treatment of authentic cases of undulant fever in human beings.—T. M. Doyle.

Jullien, J. (1933). Les formes des Brucelloses humaines. [**Forms of Human Brucelloses**].—*Presse méd.* Jan. 11th. 53-54. [Numerous text refs.]

The author describes three forms of brucellosis in man.

(1) Occult forms including all apparently healthy carriers and those whose serum is positive to serological tests.

(2) Simple or benign febrile forms which recover in the course of a few weeks following treatment.

(3) Resistant forms (about 60 per cent.) affecting more particularly aged and debilitated subjects living in unhygienic surroundings. The author states that most resistant forms, particularly those in which specific vaccines have no action, are due to the presence of other pathogenic organisms which have entered the tissues following lowered body resistance.—Gwilym O. Davies.

I. Bigger, J. W. (1932). **Br. abortus Infection in Ireland.**—*J. State Med.* **40.** 642-647. [11 refs.]

II. O'Callaghan, W. P. (1932). **Infection with Br. abortus in the Irish Free State.**—*Ibid.* 659-666. [11 refs.]

I. Bigger draws attention to the frail foundation upon which a diagnosis of *Br. abortus* infection of human beings is frequently based.

" For the present the cautious clinician will be content to try to fix, as a clinical entity, undulant fever, either by actual isolation of Br. abortus or by the co-existence of typical pyrexia with a strong agglutination titre, and will hesitate to apply to cases which clinically are atypical, but in whose sera agglutinins are found, any name which would imply that the illness is definitely due to Br. abortus."

II. O'Callaghan examined 416 human sera for the presence of *Br. abortus* agglutinins. Eighteen sera showed agglutinins varying in titre from 1 : 50 to 1 : 2,500.—T. M. Doyle.

Sordelli, A., & Molinelli, E. A. (1932). La fiebre ondulante en la República Argentina. [**Undulant Fever in the Argentine Republic**].—*Semana Méd.* **39.** 139-152. 1 table. [1 ref.]

This paper gives a detailed account of the observations and experiments which have led to the present conception of the incidence of brucella infections in the Argentine and of the relation between undulant fever and *Br. abortus* infections in animals. The first case of undulant fever was reported in 1922, but between that year and October, 1931, 75 cases have been recorded. The infection was traceable to caprine sources in one province and to bovine sources in three provinces. In Buenos Aires the abattoirs constitute an important focus of infection.

Much of the paper is of a general nature.—R. S. Roberts.

I. Reimann. (1932). Die Bang'sche Krankheit des Menschen. [**Bang's Disease in Man**].—*Tierarztl. Rdsch.* **38.** 706-707. [24 refs.]

II. Fairweather, D. S. (1932). **A Case of Undulating Fever simulating Subacute Cholecystitis.**—*Lancet.* **222.** 613-615. 2 figs. [5 refs.]

III. —. (1932). **Infection with Brucella abortus.**—*Ibid.* **223.** 581. [3 refs.]

I. The author deals briefly with the source of infection, diagnosis, symptoms and therapy.

II. The case occurred in a farmer's wife who habitually drank raw milk from a herd affected with *Br. abortus.* Her serum titre for *Br. abortus* was 1 : 1,280.

III. Editorial dealing with the following points :—the discrepancy between the frequency with which human beings are exposed to brucella infection from milk and the frequency of clinical symptoms : the fact that latent infection is common : the observations of Thomsen that veterinarians frequently show antibodies for brucella : those of Dible and Pownall that slaughterers of cattle frequently show agglutinins for brucella, whilst slaughterers dealing with sheep also show agglutinins though to a rather less extent and those dealing with pigs none : and the finding of Carpenter and Boak that the human tonsil may be a seat of latent infection.—A. W. Stableforth.

I. Lerche, & Lenzte, F. A. (1933). Weiterer Beitrag zur latenten Bang-Infektion des Menschen. [**Further Contribution on Latent Bang Infection in Human Beings**].—*Zlb. Bakt. I.* (*Orig.*). **127.** 451-455. 1 table. [8 refs.]

II. Knobloch, E. (1932). Morbus Bang und Peritonitis (Appendizitis). [**Bang's Disease and Peritonitis (Appendicitis)**].—*Münch. med. Wschr.* **79.** 1432-1433. 1 chart.

III. Hirsch, W. (1932). Ueber Paratyphusinfektion bei Morbus Bang. [**Paratyphoid Infection in Bang's Disease**].—*Klin. Wschr.* **11.** 1307-1309. [8 refs.]

I. A class of students in a dairy school made up of one animal husbandry inspector, 60 head milkers, 39 under milkers and 30 farmers were tested for *Br. abortus* antibodies. Of these 130 persons, 8 (6 per cent.) had an agglutinating titre of 1 : 120 to 1 : 960. Of 90, which were also tested for complement-fixing antibodies, 20 (22 per cent.) gave a positive result (0·05 or less). Altogether, 20 per cent. of the head milkers and 33 per cent. of the under milkers gave a positive result to one or other test, whilst none of the farmers reacted. There was no history of actual symptoms of infection. All of the persons whose sera gave a positive agglutination result, and five of those which gave positive fixation had handled infected material (afterbirths, etc.) not more than 12 weeks earlier. Most of those whose sera gave a positive fixation had had no contact for two to six years.

II. A case of peritonitis in which the patient's blood serum agglutinated

Br. abortus up to 1 : 1,000. The patient had drunk raw milk daily from a cow which had aborted several times.

III. Two cases of undulant fever are described, from both of which paratyphoid organisms were isolated on one occasion but not in subsequent attempts. The blood serum of one patient agglutinated *Br. abortus* at 1 : 400 to 1 : 800, and in this case a brucella organism was isolated by guinea pig inoculation with material from an ovarian cyst. The blood serum of the other patient agglutinated *Br. abortus* at 1 : 3,200. In neither case were paratyphoid agglutinins present at any time.—A. W. Stableforth.

I. Gilman, H. L., & Milks, C. H. (1933). **Types in Brucella Recovered from Milk in New York State.**—*Cornell Vet.* **23.** 150-152. [4 refs.]

II. Gray, J. D. A. (1933). **The Significance of Brucellar Agglutinins in Human Sera.**—*J. Bact.* **25.** 415-431. 2 tables. [73 refs.]

III. Phease, R. N. (1933). **Undulant Fever.**—*J. Roy. Army Med. Corps.* **61.** 296-300. 3 tables.

I. It has been found that the cow is susceptible to the porcine variety of the brucella group when infected experimentally, but little is known about the general incidence of this strain in the bovine under natural conditions.

The writers have isolated and typed 117 strains of brucella recovered from milk and, of these, 113 proved to be bovine and four porcine strains. One of the latter came from a herd which had been inoculated with a vaccine of bovine strain. The virulence of all four strains, as indicated by lesions in the guinea pig, was moderate, which is in contrast to the usual high virulence of strains of porcine origin. The writers found that a temperature of 143·6°–145·4°F. applied for three minutes was sufficient to destroy brucella organisms of both bovine and porcine varieties and therefore the usual pasteurization temperatures give an ample margin of safety " provided the pasteurization is operated in a proper manner," and will prevent milk-borne porcine brucellosis.

II. The attention recently directed to infection with brucella warrants further search for evidence of such infection in England. In serological diagnosis, however, difficulties may arise through the repeated failure to demonstrate agglutinins in the sera of individuals proved to be infected by the isolation of the brucella, or the finding of agglutinins in cases in which clinical features are absent or unrecognized. It is also suggested that agglutinins may be passively absorbed by the ingestion of milk containing them, or may result from the ingestion of brucella in the milk. Such ingestion might produce an active in addition to a passive immunity, and the latter would tend to mask infection.

This paper records the agglutinating power of sera obtained from 2,116 persons attending dispensaries and clinics or private patients in and around Liverpool, the great majority of the sera being submitted for the Wassermann test. The methods adopted are described. Of the 2,116 sera, 275 showed complete or partial agglutination at a dilution of 1 : 30. By means of a questionnaire it was shown that 15 of 62 women having agglutinations in their sera gave histories of abortions.

In rabbits recently immunized by the intravenous inoculation of killed brucella, and also in infected human beings, the specific agglutinins are located mainly in the carbonic-acid soluble fractions of the serum. Those in the soluble part decrease much more rapidly than those in the insoluble protein. From a survey of the literature it would appear that most workers would regard a titre of 200 as indicative of infection. The lower titres are more difficult to interpret and with them it is suggested that a better criterion for diagnosis of present or recent

infection is to be found in the ratio of the soluble and insoluble fractions. A ratio of ten or over may be indicative of a present or at least a recent infection. Conversely, a ratio well below ten may indicate either no brucella infection or at most a long-past infection.

III. This note on an outbreak of undulant fever which occurred in five men of the Lancashire Fusiliers stationed at Ferozepore is of interest because of the rarity with which this disease is nowadays seen among British troops serving in India. Infection was at first thought to have been derived from milk supplied by the contractor whose cows were driven to the cookhouse at Amritsar to be " dry-milked " (while the unit concerned was temporarily at that station), but cultural tests indicated that the organism recovered from the patients was a *paramelitensis* strain, and further enquiries incriminated goats' milk supplied by itinerant vendors other than the official contractor.—Ll. E. W. Bevan.

I. Montgomerie, R. F., & Dalling, T. (1933). **The Identification of *B. ovitoxicus* Type of Toxin from the Intestine of Sheep in Great Britain.**—*Vet. J.* **89.** 223-224.

II. Montgomerie, R. F., & Rowlands, W. T. (1933). **Pulpy Kidney Disease of Young Lambs in North Wales. The Toxicity of Intestinal Contents and the Nature of the Toxic Element.**—*Ibid.* 388-398. 6 figs. on 1 plate, 2 tables. [10 refs.]

I. The object of this note is to record the finding of a toxin resembling that produced by *Clostridium ovitoxicum* in the intestine of lambs and ewes in Britain. During investigations at the Veterinary Laboratory, University College of North Wales, into "pulpy kidney disease" in lambs, and the cause of sudden deaths ("strike") in ewes in spring, there has been demonstrated in the intestine of sheep which had died of these diseases the presence of a toxin fatal to mice, lambs and ewes when injected intravenously, and which is neutralized by antisera of *Cl. ovitoxicum* (Bennetts) and *Cl. welchii* (Wilsdon type " D "). This toxin was neutralized by a batch of lamb dysentery serum produced prior to 1930, but not by batches of subsequent production. In the intestine of some lambs presenting clinical appearances of lamb dysentery, a similar toxin has been found, whereas in other apparently similar cases a toxin is present which is neutralized only by the samples of lamb dysentery serum tested. It appears that *Cl. ovitoxicum* and *Cl. welchii* (Wilsdon type " D ") are at least closely related.

II. In a previous paper [(1931). *Vet. J.* **87.** 401.] the writers described a disease of young lambs which occurs in North Wales, commonly known as " pulpy kidney disease." During the spring of 1932 and that of 1933 further observations and investigations were made. The present article is devoted to a study of the toxicity of the intestinal contents of lambs which have died of this disease, and to the nature of the toxin found therein.

The demonstration of a highly toxic element in the contents of the small intestine of 66 per cent. of 59 cases diagnosed as " pulpy kidney " in North Wales during the 1932 and 1933 season, appears to define the condition as an enterotoxaemia. It is possible that a toxic element was present in the remaining 33 per cent. of the cases, but that its concentration was too low to allow of its detection. It is submitted that " pulpy kidney disease " of young lambs in North Wales is an infectious enterotoxaemia following the rapid production of toxin in the latter part of the small intestine by an organism of the *Cl. welchii* group. Its exact definition must, however, await the isolation of several strains of the organism which produces the toxin, and its identification by extensive cross-immunity tests with other members of the *Cl. welchii* group.

Observations showed that the toxic element in the filtrates from cases of " pulpy kidney disease " was not neutralized by the following antisera : *Cl. oedematiens, Vibrion septique, Cl. welchii* and *Cl. paludis.*

It was completely neutralized by *Cl. ovitoxicum* antiserum and by an antiserum prepared against *Cl. welchii* (Wilsdon type " D "). Lamb dysentery antiserum gave inconsistent results. The toxic element in six filtrates from cases of lamb dysentery was completely neutralized by *Cl. paludis* antiserum, and by the only batch of lamb dysentery serum used—that which gave only partial neutralization with " pulpy kidney " filtrates.—Ll. E. W. Bevan.

Clarenburg, A., & van Heelsbergen, T. (1933). Botryomycose bij het varken. [**Botriomycosis in the Pig**].—*Tijdschr. Diergeneesk.* **60.** 601-610. 3 figs. [20 refs.] [Summaries in English, French and German : abst. from orig.]

Following an account of botriomycosis in other animals and of the many points of resemblance between *Staphylococcus pyogenes aureus* and *S. botryogenes*, a case of botriomycosis in the pig is described. The cutis and subcutis of the back showed many small brownish yellow macroscopic granules.

These granules consisted of mulberry-like groups of micrococci, which bore a resemblance morphologically as well as culturally to *S. botryogenes* in the horse ; also the pathogenicity of both for mice, guinea pigs and rabbits was the same and agreed with that of *S. pyogenes aureus.* Cultures inoculated intracutaneously into a pig produced abscesses as well as botriomycotic granules.

—A. Klarenbeek (Utrecht).

Tschernjak, W. S. (1933). Die Schimmelpilzmykose des Magens bei Schweinen. [**Gastric Mycosis of the Pig**].—*Zschr. Infektkr. Haust.* **45.** 72-80. 6 figs. [13 refs.]

Two cases of circular button-shaped areas of necrosis being found in the cardiac portion of the stomach lining in young pigs are described. The lesions were about 4 mm. in diameter with sunken centres and raised peripherae. The colour was dirty grey shading to a darkish green. Microscopically, affected tissues showed karyolysis, infiltration of histiocytes and round cells and an invasion with numerous mycelial threads 5 to 8μ in diameter and having clubbed ends. These mycelia stained well with haemotoxylin and eosin, but not readily by other staining methods. No fructifications were found.—E. J. Pullinger.

I. Vawter, L. R. (1933). **A Study of Actinomycosis.**—*Cornell Vet.* **23.** 126-149. 10 figs. [34 refs.]

II. Bishop, Lucille M., & Fenstermacher, R. (1933). **An Acid-Fast Actinomyces obtained from Lesions Resembling Bovine Tuberculosis.**—*Ibid.* 288-296. 5 figs. [5 refs.]

I. The object of the work described in this report was to determine the causal organisms responsible for the conditions clinically termed " actinomycosis " encountered in North America. An historical account is given of the literature on the subject.

The material used in the investigation was chiefly obtained from an abattoir, but a small proportion was obtained direct from living animals. Fifty-eight specimens from the soft tissues of the head and 27 from bone lesions were examined. A description of the technique employed and the detailed results obtained occupies the greater part of the report.

The results of the investigation confirm the findings of previous workers that the majority of cases involving the tongue, lymph glands, and soft tissues of the

head are caused by *Actinobacillus lignieresi* and that bone lesions only were found to be associated with *Actinomyces bovis*.

From a lesion in the udder of a sow a pure culture of *Staphylococcus aureus* was obtained.

II. A description is given of lesions on a piece of pleura and diaphragm from a cow. This material was part of extensive lesions which had resulted in the condemnation of the carcass, the responsible inspector believing the condition to be tuberculosis. The cow had come from an accredited herd. *Mycobact. tuberculosis* could not be demonstrated in the tissue, but wet preparations made from the nodules showed fine branching filaments.

Calves were inoculated with suspensions of the material and later tested with tuberculin, the results being negative.

Comparisons were made between this organism and three other acid-fast actinomyces; the conclusion was reached that this organism was *Actinomyces asteroides* hitherto only described as occurring in lesions of human actinomycosis. —Geo. F. Boddie.

Buchanan, R. E. (1933). **The Present Status of Bacterial Nomenclature.**—*34th Ann. Meet. Soc. American Bacteriologists.* [Summary taken from *J. Bact.* **25.** 41.]

A consideration of the status of international agreements, of the policies of the International Committee, and of recent advances in systematic bacteriology. It is concluded as a result of the analysis that even the more radical views of pleomorphism, complex life histories, etc., will have only minor effect upon nomenclature and should not materially retard our stabilization of names.

Rettger, L. F., & Gillespie, Hazel B. (1933). **Bacterial Variation, with Special Reference to Pleomorphism and Filtrability.**—*J. Bact.* **26.** 289-318. 6 figs. on 1 plate. [23 refs.]

The term "bacterial variation" is preferred by the writers to such appellations as "dissociation," "mutability," and "life cycle phases," and is employed by them in connection with their studies relating to the cell envelope, pleomorphism and filtrability of certain bacteria. They point out that the so-called "filtrable forms" of the tubercle bacillus have assumed particular importance and express the opinion that, if bacteria must pass through various life cycle phases, and if they manifest themselves in viable forms which are filtrable, our conception of bacteriology will require a thorough revision. If, however, what are considered by many as life cycle phases of bacteria are due to environmental influences, and if the so-called filtrable forms do not exist as such, the threatened cataclysm in systematic bacteriology may be indefinitely deferred.

Their studies chiefly related to *B. megatherium* which is extremely susceptible to changes in environment, giving rise to morphological types which vary over a wide range from the more nearly "normal" to most extreme forms. On the transfer of cultures which have undergone such cellular transformation to the usual fresh culture medium, the organism again assumes its regular cell outline and orientation. In old cultures autolysis is an outstanding feature and definite cell envelopes or membranes may be seen. Repeated attempts to demonstrate the occurrence of a filtrable phase in *B. megatherium*, *Br. abortus* and *Br. melitensis* and the organisms present in raw sewage resulted in failure.—Ll. E. W. Bevan.

Fildes, P., & Knight, B. C. J. G. (1933). **Tryptophane and the Growth of Bacteria.**—*Brit. J. Exp. Path.* **14.** 343-349. 1 fig. [7 refs.]

Bacteria fall into one of two groups according to their tryptophane requirements. One group, which includes *Clostridium sporogenes*, *Cl. botulinus*, *Cl. tetani*, *B. anthracis*, *Corynbact. diphtheriae*, *Bact. typhosum* and *Staphylococcus aureus* will apparently not grow if tryptophane is absent from the medium. The second and larger group includes the autotrophic bacteria, *Pseudomonas pyocyanea*, *Bact. aertrycke*, *Mycobact. tuberculosis* and the colon group. These organisms will grow without tryptophane because they synthetize it in their protoplasm. There appears to be some relation between ability to synthetize tryptophane and pathogenicity, i.e. organisms unable to synthetize tryptophane are more liable to be obligatory parasites.—Norman Hole.

I. Swearingen, J. S., & Lewis, I. M. (1933). **The Nature of the Effect of CO_2 under Pressure upon Bacteria.**—*J. Bact.* **26.** 201-210. 4 figs., 5 tables. [6 refs.]

II. Burke, V., & Gibson, F. O. (1933). **The Gram Reaction and the Electric Charge of Bacteria.**—*Ibid.* 211-214. 1 table. [6 refs.]

I. The writers describe an apparatus for treating liquid cultures of bacteria with gas under pressure. As the result of their experiments they come to the conclusion that CO_2 (or H_2CO_3 which is thought to be in equilibrium with it), at concentrations attained using pressures of the order of 15 to 30 atmospheres, is active in precipitating colloidal bodies within the bacterial cells. The individual effects of sudden application of pressure, sudden release of pressure, time and pH concentration upon the bacteria-destroying power of CO_2 under pressure, are recorded.

II. A number of investigators have shown that bacteria carry a negative electric charge. The change and consequently the rate of migration under the influence of an electric current can be modified by changes in pH. Stearn and Stearn [(1924 and 1925). *J. Bact.* **9.** 479 and **10.** 13.] have attempted to explain the Gram reaction of bacteria as related to or determined by the iso-electric point and the pH. Winslow and Upton [(1926). *J. Bact.* **11.** 367.], however, failed to see any relation between the electric charge and the Gram reaction. The experiments carried out by the writers indicate that the Gram reaction is not determined by, and may not be correlated with, the electric charge on the cell.
—Ll. E. W. Bevan.

DISEASES CAUSED BY PROTOZOAN PARASITES.

Dikmans, G. (1933). **Anaplasmosis. V. The Nature of Anaplasma.**—*J. Amer. Vet. Med. Ass.* **83.** 101-104. [4 refs.] [For abstract of previous articles of this series see this *Bull.* **4.** 101].

This is the fifth part of a series of articles on anaplasmosis and is devoted to a discussion of the views held by different writers as to the nature of anaplasma. At the present time three opinions obtain, namely :—(a) that they are a phase in the life history of some member of the Piroplasmidae [Babesidae] ; (b) that they are " Jolly bodies " or reaction products produced by an invisible, unfiltrable virus and analogous to the " Jolly bodies " produced in other animals by splenectomy or the injection of such substances as pyrogallic acid, phenylhydrazine, etc. and (c) that they are true endoglobular parasites, *sui generis*. On the strength of the evidence available and experience in the United States, especially in Louisiana, the writer expresses the opinion that the anaplasma is not a phase in the life cycle of a piroplasm, nor a form of " Jolly body," but that it may be a parasite *sui generis*

or a " reaction product " set up by an ultravisible virus. It is, however, admitted that the question of artificial cultivation has not received sufficient attention to permit a final conclusion.—Ll. E. W. Bevan.

I. Yakimoff, W. L. (1933). La coccidiose des animaux domestiques dans l'Azerbaidjan. (Transcaucasie). [**Coccidiosis of Domestic Animals in Transcaucasia**].—*Ann. Soc. belge Méd. trop.* **13.** 93-130. 17 figs. on 2 plates, 12 tables. [93 refs.]

II. Yakimoff, W. L., Matikaschwili, I. L., Rastegaïeff, E. F., & Lewkowitsch, E. N. (1933). **Coccidia of the Felidae.**—*Parasitology*. **25.** 389-391. 13 figs. on 1 plate. [9 refs.]

I. This article does not lend itself to abstraction. It contains a store of information concerning the incidence and morphology of the oocysts of coccidia occurring in cattle, sheep and goats. The author pays little attention to aspects of coccidiosis other than the occurrence of oocysts in faeces from normal animals and their classification by morphology. The article is to a large extent a recapitulation of previous publications by the author, alone or in collaboration [this *Bull.* **3.** 23, 295, 351, 477, 609, 692 and 693].

II. The authors give a short summary of literature on the oocysts of coccidia found in the faeces of felidae and report the identification, by a study of morphology and sporulation, of *Isospora felis* in the faeces of the lion, tiger and lynx and of *I. rivolta* in the faeces of the tiger, jungle cat and leopard.—R. S. Roberts.

I. Yakimoff, W. L., Gousseff, W. F., & Rastegaïeff, E. F. (1933). Zur Huhnerkokzidiose in Russland (U.S.S.R.). II. Mitteilung. [**Avian Coccidiosis in Russia. Second Communication**].—*Zlb. Bakt. I.* (*Orig.*). **129.** 21-29. 11 tables. [5 refs.]

II. Karmann, P., & Presch, L. (1933). Wird die Kokzidiose der Küken durch eine oder durch mehrere Eimeria-Arten hervorgerufen ? [**Is Fowl Coccidiosis caused by One or Many Species of Eimeria ?**]—*Tierärztl. Rdsch.* **39.** 529-531. [10 refs.]

I. Records investigations into the types of coccidiosis of fowls in Turkestan and Leningrad, and the detection of organisms corresponding to *Eimeria acervulina*, *E. mitis*, *E. maxima* and *E. tenella*.

A limited number of experiments were carried out on the value of iodized milk, chinosol and " kokzidol " in the treatment of mixed infections. The only satisfactory results were obtained by the use of chinosol 1 : 10,000 given as drinking water. Two chickens, with mixed infections of *E. tenella*, *E. maxima* and *E. acervulina* appeared to have been freed from coccidia by this treatment. [For abstract of previous article of this series see this *Bull.* **4.** 21].

II. Groups of chickens of various ages were fed with intestinal material from a hen suffering from a type of disease corresponding to that ascribed to *E. acervulina* infection. The results varied from peracute, acute and subacute to chronic infections, depending largely upon the age of the chickens infected. Types of disease were encountered corresponding to those ascribed to *E. tenella*, *E. maxima* and *E. acervulina*. The authors therefore suggest that, since material from one type of infection can produce three different types, there is no need to consider that three different eimeria are involved. [The argument is hardly conclusive as various eimeria might have been present in the original material which exercised their varying influences according to the age of the chickens infected].

Attention is also drawn to the number of birds in these experiments which developed paralytic symptoms similar to those of fowl paralysis.—U. F. Richardson.

THOMSON, J. G. (1933). **Coccidiosis in Hares in England.**—*Trans. Roy. Soc. Trop. Med. & Hyg. London.* **26.** 324. [1 ref.]

An outbreak of intestinal coccidiosis in hares on a Dorchester estate is reported. Oocysts indistinguishable from those of *Eimeria leporis*, previously described as occurring in the hare, and two other forms were noted.

—R. S. ROBERTS.

PATTERSON, F. D. (1933). **Studies on the Viability of Eimeria tenella in Soil.** —*Cornell Vet.* **23.** 232-249. 1 fig., 8 tables. [15 refs.]

Many statements in the literature indicate the general belief that coccidia live for a year or longer in the soil, but the point does not appear to have been investigated experimentally. Various authorities are quoted. For example, CHARLES places the soil viability of fowl coccidia at four to five years ; TYZZER expresses the view that coccidia do not live long in contaminated soil ; WILSON collected non-viable *Eimeria* oocysts of cattle from a pasture on which no cattle had been for six months.

The writer therefore carried out experiments with *E. tenella* to gain information on the following points :—(a) the viability of *E. tenella* in soil under different moisture and temperature relationships ; (b) the viability in soil under natural conditions ; (c) the viability in soil exposed to direct sunlight ; (d) the viability in faeces allowed to dry in the absence of direct sunlight ; (e) the viability in decomposing faeces and (f) in putrefying caeca.

E. tenella was chosen for these studies because it produces a definite and easily recognizable disease and because no age immunity exists, thus making it possible to use previously exposed birds of any age for tests. Also the production of oocysts is abundant, thus providing a constant source of infective material.

Many interesting results were obtained which had a practical application. For example, *Eimeria* from soil under natural climatic conditions and shaded from direct sunlight caused infection of birds for 21 weeks—the maximum period tested. In soil under natural climatic conditions exposed to direct sunlight, they caused infection in birds for ten weeks : in soil with a 20 per cent. moisture content, intermittently frozen, they caused infection for 12 weeks, and in similar soil continuously frozen they caused infection for 12 weeks. In soil with 10 per cent. lime they proved infective for 12 weeks, these periods, in each case, being the maxima tested. In faeces drying in the absence of direct sunlight the parasites failed to infect after three weeks.—LL. E. W. BEVAN.

BECKER, E. R., & HALL, Phoebe R. (1933). **Cross-Immunity and Correlation of Oöcyst Production during Immunization between** *Eimeria miyairii* **and** *Eimeria separata* **in the Rat.**—*Amer. J. Hyg.* **18.** 220-223. 1 table. [5 refs.]

BALOZET, L. (1933). Sur une coccidie de la mangouste. [**A Coccidia of the Mongoose**].—*Bull. Soc. Path. exot.* **26.** 913-914.

The first article records experiments on the infection of rats immune to *E. miyairii*, with *E. separata* ; they had no greater immunity to the second coccidium than non-immunized controls. There was no significant difference in the susceptibility of the two sexes of rats to *E. separata* and it appeared that no correlation existed between the degree of susceptibility of individual rats to the two coccidia.

The second article describes a coccidium encountered in the faeces of two mongooses from Tunisia. The coccidium was thought to be *Isospora rivolta* and infection of a dog was achieved by feeding incubated mongoose faeces.

—U. F. RICHARDSON.

I. Yakimoff, W. L., & Lewkowitsch, F. E. N. (1932). *Isospora theileri* n. sp. Coccidie der Schakale. [*Isospora theileri* **n. sp. A Coccidium of the Jackal**].—*Arch. Protistenk.* **77.** 533-537. 6 figs., 1 table. [18 refs.]

II. Boughton, D. G. (1933). **Diurnal Gametic Periodicity in Avian Isospora.**—*Amer. J. Hyg.* **18.** 161-184. 3 tables, 4 diagrams. [14 refs.]

III. Pospiech. (1933). Zwei typische Fälle von tödlicher Kokzidiose der Katze. (Isospora bigemina oder Coccidium bigeminum). [**Two Typical Cases of Fatal Coccidiosis of the Cat**].—*Münch. tierärztl. Wschr.* **84.** 342-345.

I. The authors describe a coccidium of jackals in Russia. The oocysts measured approximately 21μ long by 17·5μ broad, and the sporocysts 14μ by 10μ. The organism resembled *I. rivolta*, but the authors failed to infect a dog and conclude that it is a new species which they name *I. theileri*.

II. The time of day at which oocysts of isospora appeared in the droppings of English sparrows and 17 groups of other passerine birds was studied by microscopic examination of faeces at short intervals. The oocysts were most prevalent between 3 p.m. and 8 p.m. Infected birds may appear to be negative when examined in the forenoon.

Starvation and alteration of feeding times did not influence the time of oocyst production, but artificial reversal of the hours of light led to a reversal of the appearance of oocysts to from 3 a.m. to 8 a.m.

III. This paper records an outbreak of disease in cats with 20 deaths within 14 days and the death of two cats belonging to the author. The symptoms were high fever, vomiting, salivation and tympany. Both animals died screaming with pain, and the condition can easily be mistaken for poisoning. The incubation period appeared to be very short and death always occurred within three days of the appearance of symptoms. The lesions were confined to the intestinal tract; the small intestine showed petechiae increasing in density from the stomach back, so that, at the lower end, the mucous membrane appeared red. A yellowish-green pus with an objectionable smell was found in the caecum and upper part of the large intestine.

Microscopic examination of the inflamed mucous membrane showed an invasion by isospora which had destroyed a large proportion of the epithelium. Ripe oocysts were found in immense numbers in the pus and faeces. The oocysts measured approximately 30μ long by 22μ broad and the sporocysts 16μ by 12μ.

In a general investigation as to the prevalence of the organism in cats, 38·18 per cent. were found to be infected. [The description of the organism seems to indicate *I. rivolta* rather than *I. bigemina*].—U. F. Richardson.

Russell, P. F. (1933). **The Value of an Animal Barrier in Malaria Control.**—*Science.* **78.** 101-102. [2 refs.]

This article records investigations carried out in the Philippine Islands to ascertain whether species of anopheline mosquitoes that are not commonly encountered in dwellings and that feed on animals, if present, are a factor in the human malarial problem. Out of 705 mosquitoes, most of which were caught feeding on carabaos [water-buffaloes] at night, five were found to harbour the malarial parasite. The author concludes that a controlled animal barrier must have some value in antimalarial measures. It is pointed out that the malarial parasites of the mosquitoes might possibly have been derived from monkeys or the carabaos and further investigations are being made on this question.

—U. F. Richardson.

SAISAWA, K., TAISE, K., & KANEKO, K. (1933). **Study on Trypanosoma theileri.** —*Jap. J. Exp. Med.* **11.** 101-105. 12 figs. on 1 plate, 3 tables, 1 chart.

Investigations were undertaken into the prevalence of *T. theileri* in Japanese and Korean cattle and 55·5 per cent. and 75·5 per cent. respectively were found infected. The method of blood culture was found most satisfactory for detection of infection, but the use of several kinds of culture media is recommended, as results with different media are variable.

Another method of detecting infection which gave good results was to haemolyse the blood with distilled water, then centrifuge and stain the debris.

Broad and slender forms of the trypanosome were encountered, but not the small type described by BEHN. The trypanosome was considerably larger than *T. theileri* as described by THEILER.—U. F. RICHARDSON.

TCHERNOMORETZ, I. (1933). **An Experimental Study of the "Bennett and Kenny" Reaction in Guinea-Pigs Infected with** *Trypanosoma equiperdum.* —*J. Comp. Path. & Therap.* **46.** 168-173. 5 figs. [5 refs.]

In order to determine the real sensitiveness of the so-called "Bennett and Kenny" test used in the diagnosis of trypanosomiasis of the camel and later adopted to the diagnosis of infective anaemia of the horse, the writer has carried out a special study upon guinea pigs artificially infected with *T. equiperdum.* The strain used has been maintained in his laboratory for more than ten years by continuous passage and has become adapted to guinea pigs.

The technique is described and certain factors which may influence the reaction, such as the too early removal of the serum from the coagulum, are explained. The writer states that his experiments have allowed him to appreciate in a strictly accurate way the value of the method, which is at the same time clear and gives early results.—LL. E. W. BEVAN.

VAN HOOF, L., & HENRARD, C. (1933). La transmission cyclique de races résistantes de "trypanosoma gambiense" par "glossina palpalis." [**Cyclical Transmission of Resistant Strains of** *Trypanosoma gambiense* **by** *Glossina palpalis*].—*Ann. Soc. belge Méd. trop.* **13.** 219-244. 4 tables. [5 refs.]

Nine strains of *T. gambiense* received from the Belgian Congo showed varying degrees of resistance to "tryponarsyl." The reactions of the parasites were studied in monkeys and guinea pigs infected either mechanically or by cyclical transmission. Neither method of infection was found to modify the drug resistance of the strain. The authors point out the danger of creating resistant strains by present methods of treatment and the great attention which should be paid to measures for avoiding the spread of sleeping sickness in areas where resistant strains have been detected.

In the course of these experiments it was noted that a single mechanical passage of the trypanosome through a guinea pig rendered the strain completely intransmissible cyclically. Although, on the average, only one inoculation out of every six succeeded in infecting guinea pigs, yet flies infected in the salivary glands caused infection in every case.

Tsetse flies fed with non-transmissible strains showed an intestinal infection of 24·5 per cent., whilst transmissible strains only caused intestinal infections of 10 to 14 per cent. Intestinal infection cannot, therefore, be considered as a guide to transmissibility. The records of the temperatures of the laboratory failed to show any relationship between seasonal variations and the infection of tsetse flies, but raising the temperature in one experiment did appear to favour the development of metacyclic forms of the trypanosome.—U. F. RICHARDSON.

Barlovatz, A. (1933). Une démonstration statistique de la transmissibilité à l'homme de trypanosomiase résistante au tryponarsyl. [**A Statistical Demonstration of the Transmissibility in Man of Trypanosomiasis resistant to Tryponarsyl**].—*Bull. Soc. Path. exot.* **26.** 628-632.

This article records the detection of cases of human trypanosomiasis in the Congo in which the trypanosomes were resistant to tryparsamide. The history of these cases points to their infection having been derived from a previous case which had been treated ineffectively with a standard course of tryparsamide injections.—U. F. Richardson.

Adams, A. R. D., & Lionnet, F. E. (1933). **An Outbreak of Surra among the Wild Deer** (*Cervus unicolor var*) **of Mauritius.**—*J. Comp. Path. & Therap.* **46.** 165-167. [2 refs.]

An outbreak of disease in deer, with 60 deaths, occurred on one estate in Mauritius. The symptoms were reported to be acute fever and rapid loss of condition. Four sick animals were destroyed and showed emaciation and anaemia with enlargement of the lymphatic glands. A monomorphic trypanosome, resembling *Tryp. evansi*, was detected in the heart blood of all four animals. Ten healthy animals were shot but no trypanosomes could be demonstrated in them. Keepers stated that dogs which had fed on dead deer had died. This is the first outbreak of surra reported in wild deer, although the disease has been previously reported in park deer. In view of the concentration of deer (estimated at 20,000 animals in an area the size of Surrey), the existence of endemic surra in Mauritius and the prevalence of *Stomoxys nigra* in the deer forests, the freedom of wild deer from the disease is remarkable.—U. F. Richardson.

Nattan-Larrier, L., & Noyer, B. (1933). Multiplication et division des formes schizogoniques de *Trypanosoma rabinowitchi*. [**Multiplication and Division of the Schizogonic Forms of** *Tryp. rabinowitchi*].—*C. R. Soc. Biol. Paris.* **113.** 831-834. 2 figs. [1 ref.]

Nattan-Larrier, L., & Noyer, B. (1933). Les envelopes capsulaires des formes schizogoniques de *Trypanosoma rabinowitchi*. [**The Capsules of Schizogonic Forms of** *Tryp. rabinowitchi*].—*Ibid.* 1011-1014. 2 figs. [2 refs.]

Nattan-Larrier, L., & Noyer, B. (1933). Cycle évolutif de *Trypanosoma rabinowitchi* dans le péritoine du Rat. [**The Development Cycle of** *Tryp. rabinowitchi* **in the Peritoneum of the Rat**].—*Ibid.* 1111-1115. 2 figs. [2 refs.]

These articles describe the development cycle of *Tryp. rabinowitchi* after intraperitoneal inoculation of rats either with infected blood or with cultures of the trypanosome. After an incubation period in which no flagellates can be detected, schizogonous encapsulated forms appear. Later the capsule is lost and these forms break down into uninucleate leptomonad forms. These uninucleate forms develop into crithidia and finally into trypanosome forms which invade the blood stream.—U. F. Richardson.

McNutt, S. H., Walsh, F. E., & Murray, C. (1933). **Trichomonads Associated with Breeding Troubles in Cattle.**—*Cornell Vet.* **23.** 160-168. 1 table. [7 refs.]

Cameron, H. S., Fincher, M. G., & Gilman, H. L. (1933). **Trichomonas Infection in Cattle. Preliminary Report.**—*Ibid.* 297-303. [7 refs.]

The first article records the detection of trichomonad infection in a herd which had been freed from contagious abortion, but in which abortions continued. An

extension of the trichomonad infection, associated with early abortions and sterility, occurred in a second herd whose breeding record had previously been excellent, through the use of a bull from the first herd. Incubating vaginal material for 12 to 18 hours at 37° C. was found to increase the number of trichomonads and make them more evident.

The second paper records that in a herd, consisting of six breeding units, abortion and sterility persisted in one of the units after the herd had been freed from contagious abortion. A trichomonad infection of cows was detected and, on slaughter of the two bulls, one was found to harbour large numbers of trichmonads in the fornix of the prepuce. An extension of the condition to a second herd by the use of bulls from the infected herd is again recorded. The authors consider that the role played by the protozoa is obscure, at present, but that their presence is significant.

Experimental treatment by disinfecting the uterus with 0·5 to 2·0 l. of 3 per cent. aqueous zonite, followed immediately by the same amount of 3 per cent. lugol solution, gave good results, several cows conceiving at the first service following the treatment.—U. F. RICHARDSON.

MENZANI, C. (1933). Osservazioni e ricerche su l'enteroepatite infettiva dei tacchini. [**Blackhead in Turkeys**].—*Clin. Vet. Milan.* **56.** 508-531. 31 figs., 7 plates. [47 refs.]

The author considers that the causal agent of the disease is a blastocystis Alexieff, 1911, and not the trichomonas, for the following reason :—the blastocystis was found in the walls of the caecum and in the parenchyma of the liver in all cases of acute and chronic infection ; the trichomonas was constantly absent, and only present in the caecal contents.

Experimental infection with liver containing only blastocystis produced typical cases with numerous blastocystis in the liver and blastocystis as well as trichomonas in the caecal contents.

Trichomonas were found in the caecum of healthy animals while blastocystis were absent.

The anatomical and histological lesions in blackhead of turkeys are of a granulamatous type.—F. VEGLIA (TURIN).

I. SCHLOTTHAUER, C. F., ESSEX, H. E., & MANN, F. C. (1933). **Cecal Occlusion in the Prevention of Blackhead (Enterohepatitis) in Turkeys.**—*J. Amer. Vet. Med. Ass.* **83.** 218-228. 6 figs., 1 table. [4 refs.]

II. DELAPLANE, J. B., & STUART, H. O. (1933). **Cecal Abligation of Turkeys by the Use of Clamps in Preventing Enterohepatitis (Blackhead) Infection.** —*Ibid.* 238-246. 3 figs., 2 tables. [5 refs.]

I. Enterohepatitis has made the breeding of turkeys unprofitable if not impossible in many parts of the United States of America. Medicinal agents have proved of little value. DURANT (1929) conceived the idea of ligating the caeca of poults, and thus preventing the organisms from gaining entrance to the body in the normal manner. He ligated the caeca of 34 poults, and then exposed the birds on infected ground, with 42 normal poults as controls. Thirty-nine of the control birds died, whereas all the poults with completely ligated caeca remained healthy.

The authors undertook an investigation to determine whether DURANT'S results could be repeated, and to develop a practical technique for occluding the caeca. Also it was sought to ascertain whether the removal of the caeca affected the growth and development of the turkeys and whether turkeys from which the caeca had been removed could produce eggs of normal fertility, hatchability and

viability. They found that even simple section of the caeca with careful ligation of the cut ends was often followed by peritonitis resulting fatally. Doubt is expressed whether occlusion of the caeca of turkeys will prove of any practical value.

II. The object of this experiment was to determine the mortality following DURANT's operation on turkeys, three, six and seven weeks of age, and to determine the effectiveness of the operation in the prevention of blackhead infection.

Briefly, the operation was found to be effective in preventing blackhead for a period of four months. A number of turkeys showed enlarged caeca following the operation, but it is considered that these were not of sufficient importance to make the operation impracticable if the birds are to be marketed at the usual time and are not carried on for breeding purposes. In the experience of the writers, the average mortality resulting from their operation, the technique of which is described, is less than that reported by DURANT when using a similar technique. —LL. E. W. BEVAN.

NELSON, E. C. (1933). **The Feeding Reactions of *Balantidium coli* from the Chimpanzee and Pig.**—*Amer. J. Hyg.* **18.** 185-201. 1 text fig., 5 figs. on 1 plate, 1 table. [20 refs.]

For the experiments recorded in this article *Balant. coli* was cultivated in Ringer's solution to which 10 per cent. pig serum was added, and for prolonged cultivation a small amount of starch was introduced. A drop of fluid containing *Balant. coli* was placed on a slide and to this was added the desired quantity of the material to be tested. Of the materials tested, starch grains and human blood cells were the only two ingested with great avidity. 100 per cent. of ciliates contained large quantities of starch grains within 15 minutes. This may explain the methods of cure by reducing the quantity of starch in the diet of the patient.

In the cases of yeast, blastocystis, small intestinal protozoa, inulin, carbon, carmine, Fuller's earth and sulphur, only three to four individuals or particles were ingested in an hour. Particles of carbon, carmine and Fuller's earth, treated with starch, were ingested as readily as starch grains.—U. F. RICHARDSON.

MOUREAU, M., & LE CHUITON, F. (1933). Le chien peut conserver dans son organisme les Spirellas du sodoku. [**The Dog can Harbour the Spirilla of "Sodoku"**].—*C. R. Soc. Biol. Paris.* **113.** 1206-1208. [1 ref.]

MARCHOUX, E., & CHORINE, V. (1933). Cycle évolutif des Spirochètes. [**The Development Cycle of Spirochaetes**].—*Ibid.* 1417-1419. [9 refs.]

The first article records the inoculation of dogs with the spirillum of "sodoku," a human disease of Japan and the Far East. In only one animal were spirilla detected in the blood, but others were shown to be infected by subinoculation into guinea pigs. The authors suggest that, as dogs can be infected by inoculation, they are probably susceptible in nature and, as they exhibit no symptoms, may act as undetected carriers of the organisms.

The second article summarizes the work of the authors and of COUVY on the existence of a filter-passing virus stage in the development of the spirochaete of the tick *Argas persicus*.—U. F. RICHARDSON.

DISEASES CAUSED BY VIRUSES.

BUENCAMINO, V. (1933). **Foot and Mouth Disease—Its Control and Eradication in the Philippines.**—*Gaz. Bureau Anim. Indust. Philippine Is.* **3.** 155-158.

Oriental cattle in the Philippines suffer a much milder form of foot and mouth

disease than do European, American and Australian breeds, but native cattle are more susceptible than those imported from India. The disease is of economic importance because it lays up draught oxen for one to three weeks. The immunity resulting from an attack is reported as being very brief, some animals contracting the disease two or even three times in the course of an outbreak. [This assumption is not justified. Experimental evidence shows active immunity to foot and mouth disease to be of a lasting nature ; the experiences in the Philippines can be explained by plurality of types]. The disease is endemic in certain islands or provinces. Three schemes of control and eradication are propounded. One involves a complete embargo on cattle from infected areas. The second allows export from such areas in the form of frozen meat cold-stored for 40 to 80 days. The third scheme involves patrolling all infected areas, allowing shipment for slaughter from herds free from the disease, or for any purpose under more strict conditions of disease-freedom and transport.—NORMAN HOLE.

HOF, W. (1933). Die Tenazität des Maul- und Klauenseuchevirus in der Skelettmuskulatur von Meerschweinchen unter Berücksichtigung der Wasserstoffionenkonzentration. [**Survival of the Virus of Foot and Mouth Disease in the Musculature of Guinea Pigs in Relation to the Hydrogen-Ion Concentration**].—*Inaug. Diss. Hanover*. pp. 26. 10 tables. [23 refs.]

Guinea pigs inoculated with the virus of foot and mouth disease were killed 24 to 28 hours later and bled. The carcasses were dressed and stored at 2° to 5°C. and 17° to 19°C. respectively. From time to time the hydrogen-ion concentration of the different muscles was determined and the survival of the virus tested by inoculation of muscle material into four guinea pigs. The determination of the hydrogen-ion concentration was carried out with an elektroionometer on extracts from the muscles prepared by grinding about 5 g. of the muscle in a mortar with 3 c.c. distilled water and centrifuging the suspension. A total of 21 guinea pigs were examined in such a way.

The virus could be demonstrated in the musculature of 15 guinea pigs. It survived in the musculature of carcasses stored at 2° to 5°C. for 19 hours and in that of carcasses stored at 17° to 19°C. for nine hours. The destruction of the virus is related to the change of the hydrogen-ion concentration caused by the formation of lactic acid in the muscles. The virus survived only until the reaction reached pH 6·0. The determination of the hydrogen-ion concentration cannot be used, however, as an indirect method to test the survival of the virus.

It is suggested that meat from animals killed during infection with foot and mouth disease should be stored until it has reached its maximum of acidification. According to MAKARYTSCHEFF this state is reached within 24 hours by storing the meat at 10° to 12°C.—R. WETZEL (HANOVER).

I. HARE, T. (1932). **Foot-and-Mouth Disease Lesions in the Ear Epidermis of Inoculated Guinea Pigs.**—*J. Path. & Bact.* **35.** 291-293. 6 figs. on 2 plates. [1 ref.]

II. ROUX, G. (1932). La Fièvre Aphteuse. L'Epidémie en Côte d'Or. [**Foot and Mouth Disease. The Epidemic on the Côte d'Or**].—*Bull. Syn. nat. Vét.* **11.** 42-48.

I. The author details histological findings of degenerative changes in the epidermis of the ears of guinea pigs following intradermal inoculation of the plantar pads with the virus of foot and mouth disease. No macroscopic change was noted in the epidermis of the ear. It is stated that this tissue may be infective up to ten days following the intradermal inoculation of the plantar pads.

II. The outbreak occurred when all the animals were out at pasture. The means of spreading the infection are numerous, the author quoting flies and birds. He states that cattle dealers and veterinarians did not always carry out the necessary precautions. He gives a list of losses in a herd of 50 beasts and from this calculates them at Fr.5,500,000.

The elementary precautions to prevent the spread of infection at the beginning of the outbreak were neglected. Infected animals were allowed out at grass with healthy stock, infection spreading to neighbouring areas, and cattle dealers were carrying out their usual business.

In making suggestions for measures to prevent the spread of the disease the author refers to the English methods. He makes recommendations for the amendment of the sanitary law; these are mainly comparable to the regulations enforced by the English authorities. He also recommends the slaughter of animals in original outbreaks and indemnity to be paid to the owner. It is suggested that the funds for such payment might be raised by a tax on all cattle, sheep, pigs and goats.

—Norman Dobson.

Hall, G. N. [Veterinary Pathologist, Nigeria, M.R.C.V.S., Dr. Vet. Med., Zurich]. (1933). **Investigations on Rinderpest Immunization.**—*Thesis for Veterinary Doctorate, Zurich.* pp. 158. 25 tables, 1 chart. [83 refs.]

This is a comprehensive survey of the literature of rinderpest with a résumé of the author's investigations of the disease. It is divided into eight sections with, among other aspects of the disease, the virus, methods of immunization, biology of immunization, " carriers," and susceptibility and resistance to rinderpest.

Rinderpest has an important economic bearing on stock-farming in Africa, India and the Far East and on this account numerous investigations of its various phases have been undertaken. Much information has been acquired about the virus and steady progress made in the improvement of methods of immunization.

Although some workers claim to have successfully grown the virus in a cell-free medium, their results have not been confirmed and there now appears to be little doubt that cultivation has not yet been successfully achieved.

Hall has failed to find any evidence of plurality of virus strains and all strains tested by him were of a fairly uniform virulence.

He does not believe that there is any risk of rinderpest infection being transmitted from one country to another through the medium of infected carcasses. [No mention is made of the possibility of the survival of the virus in the bone marrow of preserved carcasses—a point of cardinal importance].

Full consideration is given to the various methods of immunization and to the preparation and standardization of anti-rinderpest serum. Hall considers that the conservation of the virus in goats [method introduced by J. T. Edwards in India] is a practical method of maintaining the strain, the principal advantage of this procedure being the elimination of the risk of the transmission of piroplasmosis when virulent blood is used for the inoculation of cattle.

On the important problem of the immunization of suckling calves, Hall considers that, although they may be actually immunized and may react severely to the double inoculation, a second inoculation must be administered after weaning as only in this way can permanent immunity be obtained.

He discusses infection of virulent rinderpest blood with protozoan parasites and methods by which this complication may be overcome.

There is a valuable survey of the question of vaccination with pulp of organs, a field of investigation in which the author has had considerable experience.

[It is not possible in the space available to do justice to this excellent work.

It brings together many valuable papers that are not readily accessible and is a noteworthy contribution to the literature on the disease].—T. M. Doyle.

Conti, G. (1933). L'impiego del Trypanblau nella pratica della siero-vaccinazione contro la peste bovina. [**Use of Trypan Blue in Sero-Vaccination against Rinderpest**].—*Clin. Vet. Milan.* **56.** 592-595. [6 refs.]

In Eritrea, where the subjects used for the production of virus for sero-vaccination against rinderpest are usually carriers of *Piroplasma bigeminum* [*Babesia bigemina*], the author has adopted since 1913 the intravenous or the subcutaneous injection of 1 c.c. of 1 per cent. trypan blue solution per kg. body weight on the evening preceding the day of bleeding. He reports having prevented all mortality due to *B. bigemina* even when the rinderpest virus was obtained from animals on estates in different localities.—F. Veglia (Turin).

Keylock, H. E. (1933). **The Control of Rinderpest in a Large Dairy Herd in Shanghai, China.**—*J. Comp. Path. & Therap.* **46.** 149-158. 2 tables.

In 1926, rinderpest broke out in a dairy and anti-rinderpest serum was freely used. As a result of observations on 237 animals the author concludes that large doses of serum (300 c.c. or more) must be given to animals in advanced pregnancy to confer adequate protection. He also believes that, in an outbreak, animals that receive serum acquire immunity although they show no clinical symptoms (not even a slight temperature). He contends that an outbreak of rinderpest should occasion very little loss if there is prompt application of serum to all susceptible animals. The use of goat blood, instead of bovine virulent blood in serum-simultaneous inoculation is discussed.—Ll. E. W. Bevan.

Walkiewicz, W. (1933). Wystepowanie eozynofilji w scianie jelit przy sztucznie wywolanym pomorze swin. Badanie nad histologiczna diagnostyka pomoru swin. [**Local Eosinophilia of the Intestinal Wall in Experimental Swine Fever**].—*Wiadom. Wet.* **12.** 281-293. 1 fig. [7 refs.] [Summary in French : abst. from orig.]

A comparative examination was made of local eosinophilia of the intestinal wall in course of experimental swine fever, and the same condition in pigs poisoned by croton oil or infected either with *Erysipelothrix rhusiopathiae* or with *Bact. paratyphosum* B. Eosinophilia caused by swine fever is characterized by a concentration of cells in the submucous membrane, whilst croton oil, *E. rhusiopathiae* or *Bact. paratyphosum* B cause a slight eosinophilia principally present in the mucous membrane itself and in the blood vessels.—K. Szczudlowski (Lwów).

I. Delez, A. L. (1933). **Splenic Lesions in Hog Cholera.**—*J. Amer. Vet. Med. Ass.* **83.** 82-90. 6 figs., 2 tables. [8 refs.]

II. Sarnowiec, W. (1933). Nouvelle méthode de diagnostic des maladies causées par les ultravirus. Application au diagnostic de la peste porcine. [**A New Method for the Diagnosis of Diseases caused by Viruses. Its Application to the Diagnosis of Swine Fever**].—*C. R. Soc. Biol. Paris.* **113.** 1493-1495. [1 ref.] [Reported *verbatim* in *Bull. Acad. vét. France.* **6.** 322-324].

III. Michalka, J. (1933). Contribution à l'immunisation active dans la peste porcine. [**Immunization against Swine Fever**].—*Bull. Off. internat. Epiz.* **7.** 304-314.

I. The author made a histological study of 120 spleens from pigs artificially infected with swine fever ; 30 different strains of virus were used. Five spleens

were examined from pigs naturally infected with swine fever and 19 spleens from field outbreaks in which swine fever was suspected, either from the history or on autopsy. Twenty-two spleens were examined from pigs artificially infected with *Bact. suipestifer*. The spleens from seven normal pigs obtained from a swine fever free area were included in the study as controls.

Haemorrhagic and necrotic lesions were shown to occur in swine fever infected spleens independently of secondary infection. The early lesions were characterized by an endothelial cell proliferation adjacent to or surrounding the follicular arteries, with an outer zone of haemorrhage.

II. Sarnowiec observed during the course of work on swine fever that the subcutaneous inoculation of defibrinated blood into affected pigs was followed by a local and general reaction ; the local reaction consisted of the appearance of hot, painful swellings. He has investigated the possibility of the method as a means of diagnosing swine fever. Injections of blood or organic extracts into the ear or tail proved of little value. The intradermal injection of 0·2 to 0·5 c.c. of an antigen consisting of castor oil and virulent blood into the inner surface of the thigh gave satisfactory results. Following the injection of the antigen there are local, thermal and general reactions. These reactions occur only in animals that have been infected for at least 70 hours. The author claims success in 97·5 per cent. of cases and only 2·5 per cent. of doubtful results. [The fact that the method involves the use of live virus practically rules it out as a method of diagnosis].

III. The author obtained good results on both healthy and infected herds with the serum-virus method of inoculation against swine fever by the use of large doses of serum [the dose of serum is not stated].

According to GANSLMAYER, susceptible non-vaccinated pigs do not contract infection when held in contact with pigs inoculated by the serum-virus method. Michalka found that under these conditions non-vaccinated controls do not develop clinical symptoms, but that they contract infection is proved by their subsequent resistance to a test dose of virus.

He claims satisfactory results with a formalinized vaccine prepared from the organs of artificially infected pigs. The vaccine consists of a formalinized organic extract to which is added some powdered organs in certain proportions [details not given]. He believes, however, that the serum-virus method is the surest and most economical for eradicating the disease from a herd.—T. M. DOYLE.

I. DU TOIT, P. J., ALEXANDER, R. A., & NEITZ, W. O. (1933). **The Immunization of Mules with Formalysed Horsesickness Virus. II.**—*Onderstepoort J. Vet. Sci. & Anim. Indust.* **1.** 21-24. 2 tables. [2 refs.]

II. DU TOIT, P. J., ALEXANDER, R. A., & NEITZ, W. O. (1933). **The Immunization of Horses against Horsesickness by the Use of Formalysed Virus. Part II.**—*Ibid.* 25-50. 10 tables. [4 refs.]

I. In a previous communication [this *Bull.* **3.** 538.] it was shown that mules could be protected against horse-sickness by a suitable formalinized vaccine. Further work has confirmed these results and indicated that a spleen virus attenuated by 1 : 2,000 formalin protected against a 1 : 3,500 concentration, while mules which survived the double inoculation were solidly immune. The method was not entirely devoid of danger as a mortality rate from the vaccine of about 5 per cent. may be expected. The substitution of Tyrode's solution in place of saline as a diluent for the spleen emulsions failed to improve the vaccine.

II. A preliminary report on the immunization of the horse by formalinized virus has shown that the concentration necessary to inactivate a spleen emulsion completely was 1 : 1,000 [this *Bull.* **1.** 55]. As previously indicated, repeated

injections of such emulsions failed to protect, but the employment of a series of injections of virus attenuated by decreasing amounts of formalin resulted in a useful immunity. The duration of the protection was dependent upon the potency of the vaccine as determined by the amount of virus in the spleens. In some instances the immunity had fallen to a low level after 28 days while in others it persisted for several weeks. In consequence, it was deemed essential to consolidate the immunity by the injection of an unmodified virus.

A number of experiments on the effect of varying the size and number of the doses has shown that the most satisfactory results were obtained with four injections of spleen emulsions inactivated by concentrations of 1 : 1,000, 1 : 2,000, 1 : 3,000 and 1 : 4,000 of formaldehyde respectively. Nevertheless, the method was not without danger since a proportion of the vaccinated animals contracted horse-sickness as a result of the vaccination. Such horses as survived, however, possessed, in most instances, a solid immunity to the test virus which is regarded as one of high infectivity.

The production of a bacterially sterile product presented considerable difficulties. It was found that 0·25 per cent. of phenol could be added without detriment to the potency of the vaccine, but that filtration through a Seitz disc was unsuccessful as the antigenic portion was largely retained.

The final conclusion is that the formalinized spleen virus method holds out little hope of solving the problem of horse-sickness immunization.

—R. E. Glover.

I. Broom, J. C., & Findlay, G. M. (1933). **The Filtration of Rift Valley Fever Virus through Graded Collodion Membranes.**—*Brit. J. Exp. Path.* **14.** 179-181. 2 tables. [5 refs.]

II. Elford, W. J., & Galloway, I. A. (1933). **Filtration of the Virus of Borna Disease through Graded Collodion Membranes.**—*Ibid.* 196-206. 6 figs. on 1 plate, 4 tables. [14 refs.] [With Appendix by Barnard, J. E.]

I. The virus of Rift Valley fever obtained from the blood of infected mice was filtered through Elford collodion membranes. The virus passed without loss through a membrane with an A.P.S. 0·15μ, but was completely retained by one with a pore size of 70mμ. From Elford's calculations, the diameter of the virus particle should fall between 23mμ and 35mμ. It was possible to concentrate the virus by filtration through membranes of 70mμ or under and collecting the fluid above the disc.

II. Freshly prepared cerebral emulsions of rabbits infected with Borna disease were emulsified in broth, centrifuged and freed from fine particles by filtration through sand and paper pulp. The size of the virus elements was determined by passage through a series of " gradocol " discs of known porosity. A reduction in infectivity was noted with 0·2μ membranes while the absolute end-point was 0·175μ, from which the size of the virus may be estimated at 0·085μ to 0·125μ.

The virus was very sensitive to changes in the pH value of the medium at room temperature, a reaction of pH 7·4 to 7·6 representing the optimum in respect of stability and filtrability. A separation of Borna virus from that of " louping ill " was effected by passing a mixture of the two viruses through a 0·125μ membrane : the virus of " louping ill " alone appeared in the filtrate.

In the appendix, Barnard briefly discusses the parallelism between the size of the particles as determined by these filtration experiments compared with their appearance by dark-ground ultra-violet microphotography.—R. E. Glover.

REMLINGER, P. (1933). Vaccination antirabique et biotropisme. [**The Sequelae of Antirabic Vaccination**].—*Presse méd.* Jan. 18th. 92-95. [20 refs.] [Reprinted *verbatim* in *Maroc-Méd.* Nov. 15th. pp. 544-549].

With exception of malaria, secondary infections following antirabic vaccination are not common. Occasional cases of generalized tuberculosis, etc., are seen and are regarded as true instances of biotropism. With regard to the development of paralytic symptoms after treatment, Remlinger rejects the theory that these cases are due to an existent rabies virus which has been stimulated by the treatment, nor does he believe that they are due to the activation of a latent neurotropic virus, such as those of encephalitis or poliomyelitis. In his opinion, these accidents depend upon the toxic action of the inoculum (fixed virus).—R. E. GLOVER.

HURST, E. W. (1933). **Studies in Pseudorabies (Infectious Bulbar Paralysis, Mad Itch). I. Histology of the Disease with a Note on the Symptomatology.**—*J. Exp. Med.* **58.** 415-433. 9 figs. on 3 plates, 1 table. [12 refs.]

Details are given of the changes in the tissues of the rabbit, guinea pig, monkey and pig, after inoculation by various routes, and of one natural case of the disease in the cow from which one of the strains used was originally obtained (Shope's Iowa strain). The other strain was Aujeszky's Hungarian strain.

In rabbits, intradermal, subcutaneous and intramuscular inoculations produced intranuclear inclusions and cell necrosis in various tissues locally. The central nervous system was not affected until symptoms of itch became manifest, when nuclear changes, accompanied by inclusion body formation and followed by cytoplasmic necrosis, were found in the neurons of the spinal ganglia and posterior horn of the cord at levels corresponding to the site of inoculation, but not elsewhere. After intravenous inoculation, lesions in the spinal ganglia corresponding to the areas of itch were present. Intracerebral inoculation produced more widespread lesions in the central nervous system, mesothelial and ectodermic elements being involved.

Lesions in the guinea pig were somewhat similar to those in the rabbit. In the monkey, intracerebral inoculation produced inclusions in the nerve cells, but not in mesothelial cells. The cow material showed a few nerve cells acutely necrotic and a moderate degree of vascular and interstitial reaction. The pig, after intracerebral inoculation, showed slight cell change, and more marked vascular and interstitial reaction.

In the rabbit, death is due to respiratory failure ; the author considers that this is caused by virus acting on the very susceptible medulla. The term " infectious bulbar paralysis " is thus appropriate for the disease in the rabbit.

—A. BROWNLEE.

GREEN, R. G., KATTER, M. S., SHILLINGER, J. E., & HANSON, K. B. (1933). **Epizootic Fox Encephalitis. IV. The Intranuclear Inclusions.**—*Amer. J. Hyg.* **18.** 462-481. 13 figs. 7 tables. [6 refs.]

The disease described in these investigations was termed an encephalitis because of the occurrence of symptoms referable to the higher centres of the central nervous system, such tissue affording a constant source of experimental virus. The staining properties, size, development and occurrence of certain intranuclear inclusions discovered by the writers in the endothelial cells of foxes dying from both natural and experimental infection are described. The disease investigated differed from an epidemic which occurred in fox ranches in Iowa, which was caused by a virus identical with that isolated and studied by LAIDLAW and DUNKIN who regarded it as the virus of dog distemper.—LL. E. W. BEVAN.

KUHLMANN, H. (1933). Die Staupe der Fleischfresser. Eine Betrachtung über den augenblicklichen Stand der Staupeforschung. [**Distemper of Carnivores. A Summary of the Present Status of Distemper Research**].—*Münch. tierärztl. Wschr.* **84.** 147-152. [116 refs.]

This paper is an excellent review of the current literature regarding distemper. It deals with the aetiology and especially with the control of the disease. The immunization experiments of different workers are discussed and attention is drawn to the work of KANTOROWICZ who was able to protect dogs against artificial and natural infections by subcutaneous inoculation of living virus. Summing up, the author states that for the present the curative treatment of distemper is still a symptomatic one. Its combination with a non-specific protein therapy very often proves effective. The author points to the importance of immunization and concludes the paper with the suggestion that the above method should be tested on a large scale.—R. WETZEL (HANOVER).

VALCARENGHI, E. (1933). Sulla vaccinazione anticimurrosa specifica nei cani. [**Specific Antidistemper Vaccination in the Dog**].—*Profilassi.* **6.** 109-112. [15 refs.] [Summary in French : abst. from orig.]

The various methods which have been proposed for specific antidistemper vaccination are described briefly. Clinical observations led the author to believe that the immunity conferred by using specific distemper virus as antigen could be increased by combining a polyvalent antipyogenic vaccine with the virus. Pyogenic organisms appear to assist the body in the production of antibodies. This combined method has given encouraging results, but careful experimental work is required before a definite opinion can be given.—J. A. NICHOLSON.

I. FINDLAY, G. M., & ELTON, C. (1933). **The Transmission of Louping Ill to Field Voles.**—*J. Comp. Path. & Therap.* **46.** 126-128. 1 fig. [4 refs.]

II. ALEXANDER, R. A., & NEITZ, W. O. (1933). **The Transmission of Louping-Ill of Sheep by Ticks.** (*Rhipicephalus appendiculatus*).—*Vet. J.* **89.** 320-323. 2 charts. [5 refs.]

III. SCHWENTKER, F. F., RIVERS, T. M., & FINKELSTEIN, M. H. (1933). **Observations on the Immunological Relation of Poliomyelitis to Louping Ill.**—*J. Exp. Med.* **57.** 955-965. 4 tables. [7 refs.]

IV. RIVERS, T. M., & WARD, S. M. (1933). **Cultivation of Louping Ill Virus.**—*Proc. Soc. Exp. Biol. & Med. New York.* **30.** 1300-1301. [4 refs.]

I. This paper describes experiments which show that the field vole, *Microtus agrestis*, is susceptible to infection with the virus of " louping ill," the clinical symptoms and histological appearances resembling those found in the mouse. Infection was induced by two methods :—(a) direct intracerebral inoculation with virus, and (b) intraperitoneal inoculation with virus and at the same time intracerebral inoculation of a 2 per cent. suspension of starch in saline.

Attention is drawn to the possibilities of field voles becoming affected under natural circumstances, of maintaining a supply of virus and of infecting ticks.

II. Under natural circumstances the tick *Ixodes ricinus* is the vector of " louping ill " virus and the experiments described in this paper show that the African tick, *Rhipicephalus appendiculatus*, is also capable under experimental conditions of acquiring the virus of " louping ill " as larvae and transmitting it as nymphae. Reference is made to unpublished work which shows that bovines are susceptible to " louping ill." The authors conclude that the virulence of the virus is enhanced on passage through this tick.

[Experience with *I. ricinus* shows that great variation may occur in the

infectivity of different groups of ticks and different ticks of the same group. There has so far been no indication of increase in the virulence of " louping ill " virus by passage through this tick].

III. Since " louping ill " virus is capable of producing in monkeys and mice a disease somewhat similar to poliomyelitis, the authors carried out some experiments to determine whether any immunological relationship exists between the two diseases.

The strain of " louping ill " virus used was originally obtained from the Animal Diseases Research Association, Edinburgh. The strain of poliomyelitis virus was the " mixed virus " strain from the Rockefeller Institute for Medical Research.

Four monkeys known to be immune to " louping ill " were successfully infected with the virus of poliomyelitis, and three monkeys known to be immune to poliomyelitis were successfully infected with the virus of " louping ill."

Serum from monkeys immune to " louping ill " neutralized " louping ill " virus, but had no effect on poliomyelitis virus and serum from monkeys immune to poliomyelitis neutralized poliomyelitis virus, but not " louping ill " virus.

Experiments are also described to show that Locke's solution has a lethal effect on " louping ill " virus when it is allowed to stand in contact.

The authors conclude that immunologically, " louping ill " and poliomyelitis are not closely related.

[It is to be noted that the poliomyelitis virus used in these experiments was the " mixed virus " strain highly adapted to monkeys. More recent work shows that there is a qualitative immunological difference between the monkey passage strain and a strain recently isolated from a human being, so that the immunological relationship between " louping ill " virus and a freshly isolated strain of poliomyelitis virus is still an open question].

IV. The successful cultivation of " louping ill " virus on two types of medium containing living cells is recorded. The first medium consisted of 0·1 g. of mixed chick embryo (11 days) brain suspended in a mixture (4.5 c.c.) of monkey serum (1 part) and Tyrode's solution (9 parts). The second medium was prepared in a manner similar to that of the first with the exception that chick embryos from which the brains had been removed were used.

The cultures were initiated by the inoculation of the medium with a 10 per cent. suspension of infective mouse brain. Eleven subcultures were made on the first type of medium and the virus in the eighth subculture was titrated in mice by intracerebral inoculation. The mice receiving 10^{-4} dilutions of culture developed typical " louping ill."

Six subcultures were made on the second type of medium, the fourth subculture was titrated and mice receiving 10^{-4} dilutions became paralysed and died.

[It is of interest to note that the neurotropic " louping ill " virus is capable of multiplying in medium containing chick embryo from which the brain tissue has been removed].—W. S. Gordon.

I. Vawter, L. R., & Records, E. (1933). **Respiratory Infection in Equine Encephalomyelitis.**—*Science.* **78.** 41-42.

II. Giltner, L. T., & Shahan, M. S. (1933). **Transmission of Infectious Equine Encephalomyelitis in Mammals and Birds.**—*Ibid.* 63-64. [2 refs.]

III. Meyer, K. F. (1933). Neuere Studien über die amerikanische Gehirn-Ruckenmarksentzündung beim Pferde. [**Recent Research on the American Encephalomyelitis of the Horse**].—*Zschr. Infektkr. Haust.* **45.** 81-86. [11 refs.]

I. This paper records the infection with encephalomyelitis of two horses by the instillation into the nostrils of 50 c.c. of a 1 per cent. emulsion of filtered brain and liver virus from guinea pigs. The virus was a strain obtained from Nevada, which had been maintained by routine passage through guinea pigs and horses for 18 months.

After instillation of virus, an initial rise of temperature occurred in six to seven days and paralytic symptoms in eight to ten days. The incubation period was two to three days longer than when infection was produced by intracranial inoculation of the same virus.

Observations are also recorded tending to show that feeding racks and water troughs are not a danger in the spread of disease, since clean horses did not contract the disease when put into a corral in which infected horses had been kept, although the only precaution taken was to remove the manure. The history of outbreaks on estates is thought to indicate that some animals may remain carriers of infection.

II. This article records a small number of experiments in which encephalitic reactions were obtained in calves and pigeons following intracerebral inoculation with encephalomyelitis virus from South Dakota. Sheep, dogs, cats and fowls were apparently not susceptible.

III. Describes the disease as seen in California in 1930 to 1931. Cases appeared each year at the end of June and disappeared with the onset of winter. The incubation period, in nature, varied from one to three weeks and, after intracerebral inoculation, from three to eight days. The symptoms were fever, depression, incoordination of movements, inability to rise and congestion of the conjunctiva. Sleeping and wandering types of the disease are described. Death occurred in three to eight days, and recoveries varied from 10 to 20 per cent. *Post-mortem* examination showed jaundice and softening of lymphatic glands. The spinal fluid was increased in amount and invaded by lymphocytes and other leucocytes. The brain and spinal cord were congested and there were haemorrhages round the vessels. Perivascular infiltration occurred in the nerve centres and also in the peripheral ganglia. In the 1930 outbreaks no inclusion bodies were detected, but in the 1931 cases such bodies were described in Ammon's horn.

The virus of the disease is thought to be irregularly distributed and inoculation may fail, being most successful if the material is taken on the first or second day of illness.

Guinea pigs, rats, rabbits, mice and apes are susceptible and guinea pigs can be infected by intracerebral, intraperitoneal and subcutaneous inoculation.

The virus passes Berkefeld and Seitz filters, and is infective at a dilution of 1 : 1,000 but not at 1 : 10,000. Dry virus remains infective for five and a half months and brain, in 50 per cent. glycerine, for 12 months.

7 per cent. of the horses infected in 1930 were re-infected in 1931, but specific antibodies can be shown to exist in recovered guinea pigs and apes and protection is given by their sera. Seventeen horses were immunized by repeated inoculation but only four gave a serum which neutralized the virus. Thirty-nine infected horses were treated with this serum and 30 recovered.—U. F. Richardson.

Syverton, J. T., Cox, H. R., & Olitsky, P. K. (1933). **Relationship of the Viruses of Vesicular Stomatitis and of Equine Encephalomyelitis.**—*Science.* **78.** 216-217.

The authors tested the pathogenic action of the vesicular stomatitis virus and the equine encephalomyelitis virus on small laboratory animals and noticed a great similarity of action. The viruses were tested for cross-immunity, but were found to have none.—J. E.

Cox, H. R., Syverton, J. T., & Olitsky, P. K. (1933). **Cultivation of Vesicular Stomatitis Virus.**—*Proc. Soc. Exp. Biol. New York.* **30.** 896-898. [4 refs.]

Carrel, Olitsky and Long have already reported the propagation of vesicular stomatitis virus in a plasma medium [(1928). *C. R. Soc. Biol. Paris.* **98.** 827]. The authors describe the cultivation of the virus in Tyrode's solution containing minced 9 to 12-day-chick embryos, using as seed material Seitz filtrates of guinea pig pads or brains of infected mice. The cultures were incubated at 37·5°C. for three days. Five series were initiated, using both the Indiana and New Jersey strains, and growth obtained to between the 12th and 18th generations. The white mouse provided a satisfactory means of titrating the virus.

[In a previous report—this *Bull.* **3.** 697.—the authors have shown that the virus kills mice 36 to 72 hours after intracerebral inoculation].—R. E. Glover.

I. Lemétayer, E. (1933). Recherches d'Hématologie dans l'anémie infectieuse expérimentale des Equidés. [**Haematological Studies in Equine Infectious Anaemia**].—*Bull. Acad. vét. France.* **6.** 97-110. 1 table. [22 refs.]

II. Blanchard, L., & Vedel, R. (1933). Sur la typho-anémie du cheval. [**Equine Infectious Anaemia**].—*Ibid.* 110-115. [3 refs.]

III. Lamarre, L. (1933). Contribution à l'étude de l'anémie infectieuse du Cheval. [**Equine Infectious Anaemia**].—*Rec. Méd. vét.* **109.** 269-285. 2 maps, 9 charts. [2 refs.]

IV. Quentin. (1933). Recherches cliniques sur la typho-anémie infectieuse des Équidés. Essais de "vaccination." [**Equine Infectious Anaemia: Clinical Study and Prophylaxis**].—*Rev. gén. Méd. vét.* **42.** 321-376. [111 refs.]

I. The author has compared the different serological methods employed for the diagnosis of infectious anaemia. These observations were made on a horse artificially infected and presenting a subacute form of the disease. It was noted that during each crisis there was an increase in the sedimentation rate of the red cells, a deepening in the colour of the plasma, a slight leucocytosis affecting mainly the polynuclears, and a diminution in the red cell count. During the afebrile periods these changes were less marked. He reports a fresh phenomenon which is characteristic of anaemic bloods, viz. a poor yield of serum owing to a diminished power of contraction of the blood clot.

II. At the *post-mortem* examination of horses slaughtered in Paris, the livers, spleens and kidneys were frequently hypertrophied. The spleens showed haemorrhagic nodules, 1 to 2 cm. in size, which on microscopic examination generally presented a fibrous centre with a peripheral zone of red cells. In the kidneys there were signs of subacute nephritis together with petechiae.

Although the districts from which these horses originated were not known, it is suggested that the close resemblance of these lesions to those described in infectious anaemia are a clear indication that the animals were suffering from this disease.

III. Lamarre discusses the distribution of infectious anaemia in France and points out that in certain areas the number of cases is steadily increasing. As a means of diagnosis, he recommends the sedimentation test and illustrates the differences in the rates in normal and anaemic horses by a series of charts. Nevertheless, he recognizes that the reaction is not absolutely specific, since an examination of bloods from horses suffering from other conditions showed some overlapping. On the other hand, the blood in anaemias due to parasites, cardiac disease, etc.,

which might be confounded with the infectious form of the disease, had normal sedimentation rates.

IV. Quentin has also noted that infectious anaemia is invading districts in France previously free from the disease. Transmission by biting insects is considered improbable and examples of the appearance of grave outbreaks in the winter months are cited. The importance of infected urine and faeces was illustrated by the occurrence of successive cases on individual farms or even in particular standings.

At the suggestion of VALLÉE, field trials were undertaken with a vaccine prepared from a formalinized suspension of virulent spleen. The exact method of preparation is not given, but it is stated that one spleen furnished sufficient vaccine for 30 to 40 horses. Two doses were given at an interval of one month. More than 400 inoculations have been made without untoward results. It has been found that, in presumably healthy animals, no cases of pernicious anaemia have developed.
—R. E. GLOVER.

I. SCHULER, & VELU, H. (1933). L'anémie infectieuse des Equidés au Maroc en 1932. [**Equine Infectious Anaemia in Morocco in 1932**].—*Bull. Soc. Path. exot.* **26.** 726-741. [2 refs.]

II. VELU. (1933). L'anémie infectieuse des Equidés au Maroc en 1932. [**Equine Infectious Anaemia in Morocco in 1932**].—*Rev. vét. milit.* **17.** 199-216. [2 refs.]

I. The disease, as it occurs in Morocco, is considered under the headings of symptoms, lesions, clinical and laboratory diagnosis, susceptibility of different species and methods of infection. Apart from the experimental inoculation of the horse, no certain means of diagnosis is known, but a study of the clinical course of the disease, coupled with various laboratory tests (sedimentation of red cells, blood formulae, etc.), is of assistance.

The method of transmission is not known, but the disease seems to assume a regular seasonal character (June and July), most veterinarians attributing infection to the bites of Tabanidae which are extremely abundant in infected regions. Nevertheless, the evidence is only hypothetical and other methods of contagion have not been entirely eliminated.

II. *Verbatim* reprint of I.—R. E. GLOVER.

CURASSON, G., & DIDIER, L. (1933). Recherches sur la clavelée au Soudan français. [**Sheep Pox in the French Sudan**].—*Bull. Acad. vét. France.* **6.** 202-206.

In 1925, sheep pox was recognized for the first time in the French Sudan although subsequent enquiries indicated that it had been known for many years by the indigenous races. The disease is characterized by the appearance of hard bean-like swellings, which later develop necrotic centres, spread over the surface of the body. In some instances, lesions are also observed around the lips and on the buccal mucous membrane.

In adult animals of the local breed the disease is invariably mild in nature, although cross-bred Merinos are more severely affected : in young stock, on the other hand, a high mortality may be encountered, death supervening from pneumonia. It would appear that the benign character of the affection of the adult sheep is due to a species-resistance, since local animals inoculated with a fully virulent Algerian strain of sheep pox showed a mild reaction simulating the indigenous disease. Cross-immunity experiments undertaken with sheep immunized against local and Algerian strains respectively suggested that the two viruses were identical.—R. E. GLOVER.

Ramazzotti, G. (1933). La Schiavina o Vaiolo Ovino. Vaccinazione e Sieroterapia contro la Schiavina. [**Sheep Pox Vaccination and Serotherapy**].—*Clin. Vet. Milan.* **56.** 497-507 and 584-591. 5 figs. on 2 plates. [32 refs.]

The author describes the preparation of a specific serum possessing preventive and curative properties against sheep pox.

A vaccine was also prepared by mixing liquid filtrate of virus with saponin according to Mazzucchi's method in the preparation of " carbozoo."

In five series of experiments the vaccine gave a solid and lasting immunity ; it proved safe when administered to pregnant ewes, and preserved its efficacy for seven months when kept in bottles.—F. Veglia (Turin).

Zeller, H., Gildemeister, E., & Hilgers, P. (1933). Untersuchungen über das Vorkommen von Pockenvirus in Fleisch, Organen und Blut von Rindern, die zur Gewinnung von Pockenlymphe gedient haben. [**On the Occurrence of Vaccinia Virus in Meat, Organs and Blood of Cattle used for the Production of Smallpox Lymph**].—*Zlb. Bakt. I. (Orig.).* **128.** 21-30. 12 tables.

The tests were carried out by means of the Ohtawara method (intratesticular inoculation into rabbits). The virus of smallpox could not be demonstrated in veal used for lymph production 24 hours after slaughter. With respect to the autolytic processes in the meat which render the living conditions for the virus more unfavourable, it is assumed that veal from calves used for lymph production is with certainty free from virus three days after slaughter. The virus proved to be still active in organs 24 hours after slaughter.—R. Wetzel (Hanover).

Fukushima, T. (1933). Zur Frage der Nekrosebildung bei Hühnerpest Enzephalitis. [**Necrosis in Fowl Plague Encephalitis**].—*Deuts. tierärztl. Wschr.* **41.** 177-179. 2 figs., 1 table. [6 refs.]

The material for investigation came from 27 fowls artificially infected in various ways with virus. Histological specimens were fixed in formol saline, embedded in wax and stained by the haemotoxylin-eosin method and also by Lenhossek's toluidin blue.

Three types of necrosis were encountered :—(1) simple necrotic foci ; (2) collections of big vesicular cells and (3) a combination of the two forms. Simple necrosis appeared to be the primary lesion and was usually found when the disease had run a short course. The vesicular cells appeared to be associated with weak infections of virus.—E. J. Pullinger.

I. Combiesco, D., & Angelesco, J. (1933). Recherches expérimentales sur typhus exanthématique chez le chien. [**Experimental Research on Typhus Exanthematicus in the Dog**].—*C. R. Soc. Biol. Paris.* **113.** 497-498. [1 ref.]

II. Roberts, J. I., & Tonking, H. D. (1933). **A Preliminary Note on Vector of Tropical Typhus in Kenya.**—*East African Med. J.* **9.** 310-315. [2 refs.]

I. Records the inoculation of dogs, intracerebrally and intraperitoneally, with strains of exanthematic typhus from Poland and Mexico. No apparent reaction occurred in the dogs, but suspensions from their brains inoculated into guinea pigs caused typhus reactions.

II. This article records preliminary investigations into the vector of tropical typhus of human beings in Kenya. A survey of the houses in which cases of typhus had occurred suggested that the vector might be *Rhipicephalus sanguineus*, the brown dog tick. Emulsions of these ticks inoculated into guinea pigs caused typhus reactions. A survey of the area of Nairobi in which the disease is most prevalent revealed that only very few of these ticks were present on the dogs. The tick is

said to bite human beings but, as on leaving the host it climbs upwards, it is often not noticed. *R. pulchellus*, a tick of game, is also suggested as a possible vector.
—U. F. Richardson.

I. Martin, C. L. (1933). **Experiments on Fowl-Pox.**—*J. Amer. Vet. Med. Ass.* **83.** 188-189.

II. Brunett, E. L. (1933). **Studies on Fowl-Pox Vaccination.**—*Ibid.* 774-786. 6 tables. [6 refs.]

III. Kligler, I. J., Komarov, A., & Fiat, N. (1933). **A Study of the Relative Efficacy of Pigeon Pox and Attenuated Fowl Pox Vaccines.**—*J. Comp. Path. & Therap.* **46.** 248-256. 3 tables. [11 refs.]

I. The author has used unattenuated fowl pox virus during the past seven years for immunization against fowl pox. The virus was applied with a brush to three to six feather follicles on the leg. This method gives a solid protection for the average life of a fowl. [The disadvantages inherent in the use of unattenuated fowl pox virus have been referred to previously in this *Bull.* **2.** 86].

In order to test the value of the " stick " method of inoculation [an incision about $\frac{1}{8}$th inch long is made on the leg with a pointed scalpel that has been dipped in the virus] as compared with the follicle method, 7,500 fowls were vaccinated.

The " stick " method gave results as favourable as the follicle method, with the added advantages of a considerable economy of time and in the amount of vaccine used, milder reactions and a reduction in the number of cases of generalization of the infection.

II. The author tested the comparative protective value of cow pox, pigeon pox and fowl pox viruses against artificial and natural infection with fowl pox.

Preliminary attempts were made to adapt fowl pox virus to rabbits and pigeons, but only slight success was obtained. Cow pox virus was shown to confer no protection against fowl pox.

Pigeon pox virus was propagated in the usual way on the inoculated breasts of pigeons. The inoculated area of skin was then removed, suspended in 20 per cent. glycerine solution and stored in the cold. The skin suspension was used as a kind of stock solution and the vaccine was prepared from it by dilution.

Two experiments were carried out in which it was shown that 11-week-old chickens vaccinated with pigeon pox virus failed to resist fowl pox infection when tested 16 days later by dermal inoculation.

In another experiment 20 two-month-old cockerels were inoculated with pigeon pox virus and nine of them failed to resist natural infection with fowl pox when exposed 60 days after vaccination.

The pox lesions on the nine birds were small, showed no tendency to spread and cleared up sooner than on the susceptible control fowls. A similar experiment was carried out using six-month-old cockerels and exposure to infection was delayed until 100 days after vaccination. In this experiment the pigeon pox vaccinated fowls resisted the fowl pox infection much better than the susceptible controls and the lesions exhibited by them were smaller and healed more quickly.

[The pigeon pox vaccine was prepared somewhat differently from the method employed in this country. Experience has shown that the virus tends to lose its virulence gradually when suspended in glycerine saline and that it is preferable to store it in powdered form in the cold and to suspend it in the glycerine saline when required for use].

III. The authors carried out comparative tests with a roughly standardized fowl pox vaccine containing live virus and a pigeon pox virus vaccine. The pigeon pox virus produced mild, rapidly-healing lesions while the fowl pox vaccine caused

systemic disturbance and in a " greater or lesser percentage " of fowls generalization of the infection occurred.

" In five out of 60 settlements in which pigeon pox vaccine was used this year outbreaks of fowl pox occurred four to six months after vaccination, but in no case were more than 10 per cent. of the birds affected. This indicates a reasonably satisfactory flock immunity."

The risk involved in the use of live fowl pox vaccine was considered to be small in the case of healthy birds, but may be more serious in an unhealthy flock. —T. M. Doyle.

I. Lillie, R. D. (1933). **I. The Pathology of Psittacosis in Man and II. The Pathology of Psittacosis in Animals and the Distribution of *Rickettsia psittaci* in the Tissues of Man and Animals.**—*Nat. Inst. Health Bull. Washington.* No. 161. pp. iii + 66. 7 plates.

II. Meyer, K. F., & Eddie, B. (1933). Latente Psittacoseinfektion bei Sittichen. **[Latent Psittacosis Infection in Parrots].**—*Zschr. Infektkr. Haust.* **44.** 237-242. 3 figs. [1 ref.]

I. The pathology of psittacosis in human beings is described. Detailed protocols of this condition in naturally and in artificially infected parrots are given ; these protocols are unsuited for abstraction. *R. psittaci* has been found in almost all types of tissue cells of epithelial origin. The aetiological relationship of *R. psittaci* to psittacosis is indicated but is not proved.

II. From 10 to 90 per cent. of parrots in aviaries in the United States of America are carriers of the virus of psittacosis. The most constant macroscopic evidence of infection was splenic enlargement to a diameter of over 4 mm. Young birds are more liable to be carriers than old ones.—E. J. Pullinger.

I. Smith, W., Andrewes, C. H., & Laidlaw, P. P. (1933). **A Virus Obtained from Influenza Patients.**—*Lancet.* **225.** 66-68. 2 figs. [3 refs.]

II. —. (1933). **The Virus of Influenza.**—*Ibid.* 83.

I. The authors succeeded in infecting ferrets with throat-washings obtained from influenza patients as early as possible after the development of symptoms. The throat-washings were filtered through a membrane impermeable to bacteria and inoculated subcutaneously and by intranasal instillation into two ferrets. Both animals, after an incubation period of two days, showed a diphasic temperature response, nasal catarrh and variable systemic disturbances. A detailed description of the symptoms exhibited by affected ferrets is given.

The disease was frequently transmitted from an affected to a normal ferret as the result of 24 hours contact. Twenty-six serial passages from ferret to ferret were obtained by the intranasal instillation of a suspension of the ground-up turbinated bones. Intranasal instillation is apparently the only successful route of infection. The inoculation of blood, spleen and lymph glands gave negative results. The size of the virus as estimated by passage through " Gradocol membranes " (supplied by Elford) would appear to be no larger than that of the viruses of vaccinia and herpes febrilis.

One of two ferrets recovered from the disease was shown to be protected against the same strain of virus three months later. The serum of a ferret that recovered from the disease was shown to be capable of neutralizing strong suspensions of the virus. There appeared to be a close antigenic relationship between the human virus and the virus of swine influenza isolated in America.

II. An annotation of I.—T. M. Doyle.

McCordock, H. A., & Muckenfuss, R. S. (1933). **The Similarity of Virus Pneumonia in Animals to Epidemic Influenza and Interstitial Broncho-pneumonia in Man.**—*Amer. J. Path.* **9.** 221-252. 11 figs. on 4 plates. [63 refs.]

An interstitial broncho-pneumonia frequently complicates certain human epidemic diseases, a fresh incision of the lung revealing greyish-yellow peri-bronchiolar nodules, closely resembling tubercles, the intervening lung tissue being collapsed and often dark red. The condition is observed most frequently in measles, whooping cough and post-influenzal pneumonia.

The authors find that intratracheal injection of dilute vaccinia virus into rabbits sets up a proliferative cellular lesion which they term an interstitial virus pneumonia, and the subsequent introduction of bacteria gives rise to interstitial broncho-pneumonia.

Known virus diseases in which interstitial broncho-pneumonia is found are measles, generalized vaccinia, psittacosis and some cases of canine distemper, and the authors regard such lung changes as the type reaction in a combined attack by a virus and bacteria. They therefore accept these lung changes in human influenza and whooping cough as indicating the presence of a virus.—S. H. Gaiger.

I. Feemster, R. F., & Wells, W. F. (1933). **Experimental and Statistical Evidence of the Particulate Nature of the Bacteriophage.**—*J. Exp. Med.* **58.** 385-391. 2 tables, 2 graphs. [8 refs.]

II. Burnet, F. M. (1933). **Specific Agglutination of Bacteriophage Particles.** —*Brit. J. Exp. Path.* **14.** 302-308. 6 figs. on 1 plate, 2 tables. [6 refs.]

I. If bacteriophage is a particulate entity in the sense that a unit is capable of initiating complete lysis, the absence of a single element can be determined experimentally and can also be expressed mathematically according to Poisson's law of small chances. In support of this contention, tubes were set up with decreasing amounts of phage (approximately 100 to 160 per series) and the number of tubes in which lysis occurred was determined. The results were in close agreement with those calculated from the law of chance distribution of particles in suspension.

II. Washed bacteriophage preparations obtained from a small plaque large particle phage, C16 [(1933). *J. Path. Bact.* **36.** 307.], were concentrated on "gradocol" membranes impermeable to the particles (50 mμ A.P.S.). The corresponding antiserum after absorption with the S and R forms of the parent bacterium was added to the phage suspension and incubated at 50°C.: agglutination was often visible after three to four hours. The reactions followed the law of optimum proportions. The findings suggested that the bulk of the precipitate was derived from the antigen, i.e. the reaction was an agglutination and not a precipitation.

None of the serologically unrelated phages showed any agglutination with anti-C16-serum. The aggregates, when examined by ultra-violet light microphotography, were composed of particles about 50 mμ in diameter.

—R. E. Glover.

INVERTEBRATE VECTORS OF DISEASE.

I. Hoeppli, R., & Feng, L. C. (1933). **Experimental Studies on Ticks.**—*Chinese Med. J.* **47.** 29-43. 4 plates. [28 refs.]

II. Jellison, W. L., & Philip, C. B. (1933). **Technique for Routine and**

Experimental Feeding of Certain Ixodid Ticks on Guinea Pigs and Rabbits.—*Publ. Health Rep. Washington.* **48.** 1081-1082. 6 figs. on 2 plates. [1 ref.]

I. The writers have studied the lesions caused by ticks. In cases of natural infestation with ticks the lesions consisted of an inflammatory infiltration in the corium, chiefly perivascular, and usually combined with local hyperaemia, oedema and haemorrhages of varying intensity. The epithelial layer often showed oedema, parakeratosis and a thickened cornified stratum. In addition to the inflammatory reaction, a homogeneous area was found surrounding the mouth parts of the tick in infestation with certain species of *Haemaphysalis*, *Dermacentor*, *Hyalomma*, *Argas* and *Ixodes* ; it is suggested that this area may represent a liquefaction of tissue by some secretion of the tick, possibly saliva. The salivary glands of *D. sinicus* and *Hyalomma detritum peretrigatum* were found to contain a powerful anticoagulin against blood *in vitro*. Emulsions of the eggs of *D. sinicus*, *Haemaphysalis campanulata hoeppliana* and *Hyalomma detritum peretrigatum* were proved to be toxic on injection into dogs, rats, guinea pigs and hamsters. None of the animals which died from one to 14 days after the injection showed any symptoms of tick paralysis. Histologically, degeneration of the ganglion cells and myeline sheaths in the spinal cord, and degenerative changes of liver cells, epithelium of the convoluted tubules in the kidneys, and necrosis within lymph follicles of the spleen were found.

II. Capsules made from the threaded end rings and covers used in cardboard mailing tubes were affixed to the host animals and held in place by an adhesive tape girdle. For observation or ventilation, pieces of celluloid or gauze respectively may be set into the cover.

Ticks in these capsules can be manipulated without removing the adhesive girdle by unscrewing the cover—J. S. Steward.

Morrison, L., & Leslie, A. (1933). **A Review of our Present Knowledge of the Life History and Control of the Sheep Ked (Melophagus ovinus) in New Zealand.**—*Canterbury Agric. Coll. Lincoln.* pp. 9. 2 tables. [3 refs.] [fcp].

The authors have tried experiments on the longevity of keds and their hatching under New Zealand conditions. Adult keds will survive off the host under varying temperatures and conditions up to six days.

Pupae may hatch at room temperature in 27 days but usually require a higher temperature, 85° to 95°F. If an infested fleece is kept at shed temperature the young keds hatch daily up to 37 days. Dipping reduces the hatchability of pupae, but does not entirely prevent it. The length of wool and, combined with that, the amount of retention of dip is the greatest factor in control of the ked. Oily dressings entirely prevent hatching of pupae.—C. S. M. Hopkirk.

I. Swynnerton, C. F. M. (1933). **Some Traps for Tsetse-Flies.**—*Bull. Entomol. Res.* **24.** 69-106. 4 text figs., 11 figs. on 3 plates, 8 tables. [1 ref.]

II. Jack, R. W. (1933). **Experiments with Tsetse Fly Traps against** *Glossina morsitans* **in Southern Rhodesia.**—*Rhodesia Agric. J.* **30.** 393-398.

I. Swynnerton describes and illustrates 20 new forms and variations of tsetse traps which have been tested against *G. palpalis*, *G. pallidipes*, *G. morsitans* and *G. swynnertoni*.

These comprised numerous varieties of screen traps that were stationary, swinging or revolving and attracted visually only, and screen traps accommodating animals as baits that attracted by scent. Experiments were also carried out with traps in which the flies were attracted from light into darkness and darkness to light. An electric screen trap with voltage varying from 1,000 to 2,000 volts and

a maximum frequency of 30 cycles was tried attached to the back of a train or lorry and gave promising results. It was found impossible to kill tsetse flies with a voltage utilizable in practice, but they were stunned and fell into a tray with some oil in it in which they rapidly died.

Success in trapping with sight traps was considered to depend upon hunger conditions which are connected with atmospheric humidity and the presence of food animals. The close proximity of cattle to traps greatly improved the catches. *G. palpalis* is thought to be the most suitable tsetse for trapping and *G. pallidipes* the next, but even against these, total success by trapping alone cannot be expected. The next important objective is the production of a scent attractive to the flies that is not dependent upon the presence of an animal and is not too evanescent for use in traps. For details of the construction of the traps used those interested should consult the original.

II. This is a somewhat popular discussion of the principles underlying the effective working of tsetse fly traps. The attractiveness of certain traps is believed to be due to the shade offered and they are consequently most successful in warm dry weather, those species which are shade-loving, such as *G. pallidipes*, being caught in the greatest numbers. The substitution of dark blue or black for the colour of the main body of traps of this type proved advantageous. It was found that none of the models attracted *G. morsitans* in anything approaching the same numbers as the Harris traps attract *G. pallidipes* in Zululand.—J. S. Steward.

DISEASES CAUSED BY METAZOAN PARASITES.

Wehr, E. E. (1933). **The Life History of Gastrophilus Larvae of the Horse, and Lesions Produced by the Larvae.**—*Cornell Vet.* **23.** 254-271. [21 refs.]

The author points out that there are still several missing links in our knowledge of the chain of events which constitute the life cycles of the various species of *Gastrophilus*. The chief lacunae are the periods and paths of migration after the entry of the larvae into the mouth. The works of previous authors are reviewed. Experimental studies were undertaken to ascertain the factors determining hatching of eggs, the entrance of larvae into the digestive tract and their further development within it. There is a short account of the lesions produced. Embryos of some species may remain alive within the egg for several months. Suitable conditions of temperature, friction and moisture are needed for hatching, but of these the last appears to be least important.

G. inermis hatches on the hairs of the cheeks, enters the epidermis, journeys to the mouth and wanders in the subepithelial layer inside the cheeks until the first moult, when it leaves the mouth and is carried to the rectum. *G. pecorum* deposits its eggs on food etc. ; the larvae form galleries under the mucous membrane of the cheeks, they moult into the pharynx, attach to the glandular portion of the stomach and finally reach the rectum. The lips, tongue and teeth play a part in the hatching of *G. intestinalis*. The larvae enter the mucous membrane of the tongue, lips and cheeks, under which they wander for several days. It is supposed that they moult after leaving these situations. They then go on to the left sac of the stomach. *G. haemorrhoidalis* deposits around the mouth ; the eggs hatch, but it is not known exactly how the larvae reach the mouth ; it is presumed to be by crawling. They prefer the mucous membrane of the tongue. After moulting they attach in the pharynx, stomach and rectum, and finally at the anal ring. The stay here is short. Very little is known of the movements of the larvae of the throat botfly (*G. nasalis*) after hatching. Apparently, however, they hatch without

special requirements of friction and temperature and finally come to rest on the mucous membrane near the pylorus.—A. W. N. Pillers.

Puri, I. M. (1933). **Studies on Indian Simuliidae. Part VIII. Descriptions of Larvae, Pupae, Males and Females of** *S. aureohirtum* **Brunetti and** *S. aureum* **Fries.**—*Ind. J. Med. Res.* **21.** 1-9. 1 text fig., 12 figs. on 1 plate. [9 refs.]

Puri, I. M. (1933). **Studies on Indian Simuliidae. Part IX.** *S. equinum* **var.** *mediterraneum* **Puri and** *S. paraequinum* **sp. n.**—*Ibid.* 11-16. 12 figs. on 1 plate. [7 refs.]

Puri describes at length the larvae, pupae and adults of *S. aureohirtum* Brunetti, only a male having been previously briefly described.

The adults of *S. aureum* are also described, particular attention being paid to the terminalia, hitherto undescribed.

In the second paper all stages of *S. equinum* var. *mediterraneum* Puri and the adults of *S. paraequinum* n. sp. are described. Illustrations of the adult terminalia are provided in both papers.—J. S. Steward.

Korkhaus, R. (1933). Ueber das Auftreten von Futtermilben im Magen und Darm von Hunden. [**Appearance of Food Mites in the Stomach and Intestine of Dogs**].—*Berl. tierärztl. Wschr.* **49.** 389-391. [15 refs.]

The author states that there are a number of records in the literature of the spontaneous occurrence of acari in the intestinal tract of animals. They are mostly found in the large domesticated animals ; there are a few recorded cases in birds and small domesticated animals, and even less in carnivora. Further research work is necessary before the subject is put on a sound pathological basis. He has reviewed the literature in order to get a clear picture of the epizootiological, hygienic, pathological and parasitological aspects. The work done previously has not been on correct lines. There are references to Böhm's (1920) finding of *Tyroglyphus farinae* and *Cheyletus eruditus* in a dog's faeces, and to somewhat similar findings by Hinz, Grawert, Kunze, Lampe, Vitzthum, and others. In the faeces the mites have usually been dead and often damaged. They have been found in dog-biscuits and other farinaceous foods. Some feeding experiments have been undertaken with doubtful or negative results. When the stomach of a dog was emptied by the use of apomorphine half an hour after feeding, the mites were dead (Kunze). The symptoms and *post-mortem* changes have not been constant. The various explanations of the methods of injury when large numbers of mites enter the alimentary canal, such as a toxin, mechanical irritation and allergy, are passed in review. The author seems to lean to Hase's work in human beings on sensitization. In examining faeces, 10 to 20 cover glass preparations ought to be made. The histories, symptoms and faecal examinations of five dogs are given. In some cases the infected food was withheld and the results noted. The mites found were *T. farinae* and *C. eruditus*. In one dog which was accidentally killed the author says that the mites played a part in the production of lesions. The symptoms and lesions are of an inflammatory nature. The author leaves the question open and says that it must be settled by exact experimental work to which he hopes to contribute.—A. W. N. Pillers.

Swales, W. E. (1933). **On** *Streptovitella acadiae* **(gen. et spec. nov.). A Trematode of the Family Heterophyidae from the Black Duck** (*Anas rubripes*).—*J. Helminthol.* **11.** 115-118. 1 fig. [4 refs.]

The new genus is more closely related to *Diorchitrema* than to any other genus of the Heterophyidae. Wild ducks which were dying in large numbers in a part

of Nova Scotia were found to be harbouring enormous numbers of the newly described species.

Streptovitella acadiae is a very small parasite measuring only 0·45 to 0·62 mm. long by 0·15 to 0·21 mm. wide and the infestation which the author describes must be one of the heaviest ever recorded, as many as 39 of the parasites having been found in one microtome section of the small intestine only 8 μ in thickness. —E. L. Taylor.

MacHattie, C., Mills, E. A., & Chadwick, C. R. (1933). **Can Sheep and Cattle Act as Reservoirs of Human Schistosomiasis?**—*Trans. Roy. Soc. Trop. Med. & Hyg. London.* **27.** 173-184. 6 figs. on 1 plate. [18 refs.]

The authors, a doctor and two veterinarians, attacked this question in Iraq, where material was plentiful, by first reviewing expressed opinions from the time of Sonsino to the present day. The position is obscured by the fact that *Schistosoma mattheei*, which occurs in cattle, sheep and human beings in Africa, is regarded by many as a separate species and by others as identical with *S. bovis*.

Working among (a) tribes where human beings were known to be affected with *S. haematobium* and the cattle and sheep also with *S. bovis* ; (b) those where human beings harboured *S. haematobium* but cattle and sheep showed an entire absence of *S. bovis* and (c) tribes where *S. bovis* was prevalent in the animals and yet *S. haematobium* was unknown in human beings, they arrived at the following conclusions and findings :—

(1) A female *S. haematobium* was recovered from a man 82 years of age. It measured 28 mm. in length and contained 106 eggs as compared with the classical description of 20 to 21 mm. and 20 to 30 eggs.
(2) From experiments conducted, *S. haematobium* cannot infect sheep.
(3) From extensive experience, *S. bovis* does not infect human beings.
(4) The occasional appearance of eggs resembling those of *S. bovis* in the urine of human beings is due to an abnormality in the formation of the egg-shells on the part of *S. haematobium*. There are photographs of *bovis*-like eggs from *S. haematobium*. A female may occasionally produce both types.
(5) The rare occurrence of eggs resembling those of *S. bovis* in the urine of persons also excreting *S. haematobium* eggs is due to the above explanation and does not justify the conclusion that cattle and sheep constitute a potential reservoir of human urinary schistosomiasis.—A. W. N. Pillers.

Malkani, P. G. (1933). **A Rapid Method of Evaginating the Scolices in Parasitic Cysts.**—*Ind. Vet. J.* **10.** 122-124. [Paper presented to the Indian Science Congress, 1933, held at Patna. The author's abstract of this paper appeared in *Ind. Vet. J.* **9.** 193].

Several solutions were tried, but none proved to be better than a 5 per cent. solution of sodium taurocholate. In a 1 per cent. solution, evagination of the scolices of *Cysticercus tenuicollis* and *C. bovis* occurred in 18 hours and, in a 2 per cent. solution, in two hours. [This is a recognized method of testing the viability of cysticerci in meat].—E. L. Taylor.

Wetzel, R. (1933). Der weniggliedrige Hühnerbandwurm (Davainea proglottina) und seine Bekämpfung. [**The Small Poultry Tapeworm** *Davainea proglottina* **and its Control**].—*Arch. Geflügelk.* **7.** 14-22. 2 figs. [9 refs.] [Summary in English : abst. from orig.]

A semi-popular account is given of the author's previous work on the life history of this tapeworm [this *Bull.* **4.** 250]. The grey field slug, *Agriolimax*

agrestis, is regarded as the principal intermediate host in Germany and control of the tapeworm depends largely upon the control of this slug. Künkel is quoted as showing that species of *Agriolimax* and *Arion* live for about one year and species of *Limax* for one to two years. Suggestions are made for the control of snails by land " dressings " (best carried out at night) and by " traps."—E. L. Taylor.

Marotel, & Vitu. (1933). Troisième observation française de ladrerie ovine. [**Ovine Cysticercosis in France**].—*Rev. vét. et J. Méd. vét.* **85.** 321-333. 1 fig., 1 table. [3 refs.]

A number of cysticerci found in the muscles of the carcass of a sheep corresponded in morphology with the descriptions of *Cysticercus ovis* (the name *C. oviparieus* is preferred by the authors because of Cobbold's original species being insufficiently described). Feeding experiments were carried out on two dogs without producing infection, but nine-tenths of the cysts were not alive and even those which appeared to be alive may have been too old to produce infection. It is not possible to distinguish between *C. ovis* and *C. cellulosae* with certainty on morphological grounds alone and, because of the possible danger to human beings, the authors consider it most important to carry out cross-transmission experiments ; they consider that until this has been done all measled mutton should be condemned as unfit for human food.—E. L. Taylor.

Lièvre, H. (1933). Cysticercose cardiaque bovine. [**Bovine Cardiac Cysticercosis**].—*Rev. vét. et J. Méd. vét.* **85.** 373-376. 1 plate.

Lièvre records a heavy infestation of the heart muscle in an 11-month-old calf by *Cysticercus bovis* in Algiers. The animal appeared to be in excellent health before slaughter. 176 cysts were visible on the inside and outside of the heart and there must have been many others in the substance of the muscle. The heart is figured. Around this case the author weaves an interesting account of the experiments of Saint-Cyr, Perroncito, Cobbold, and Simonds. Comparisons are made with the pig and *C. cellulosae*. The pig is often coprophagous and *Taenia solium* segments are shed in chains. Hence heavy infestations often arise in the pig. *T. saginata* sheds its segments singly and cattle are rarely coprophagous, but Fleming reported that they may be so in India. In such cases infestation may be much heavier than is usually the case.—A. W. N. Pillers.

Turner, E. L., Berberian, D. A., & Dennis, E. W. (1933). **Successful Artificial Immunization of Dogs against Taenia Echinococcus.**—*Proc. Soc. Exp. Biol. & Med. New York.* **30.** 618-619. [1 ref.]

Miller's success in the immunizing of rats against *Cysticercus fasciolaris* has suggested a trial of the same methods against *T. echinococcus* in dogs. Dried and powdered scolices and germinative membrane were used as antigen and a 1 per cent. phenolized suspension of this was injected in amounts of 0·5 and 1 c.c.

Of ten echinococcus-free dogs, eight received doses of the antigen and two were kept as controls, all subsequently receiving fresh fertile hydatid cysts. At autopsy the controls were found to be very heavily infected, but the immunized animals were either free or almost free from infection, only one dog containing as many as six *T. echinococcus*.—E. L. Taylor.

I. Witenberg, G. (1933). Zur Kenntnis der Verbreitung von Echinokokkus und Trichinen in Palästina. [**Echinococcus and Trichinella in Palestine**]. —*Arch. Schiffs- u. Trop.-Hyg.* **37.** 37-41. 1 fig. [8 refs.]

II. Tubangui, M. (1933). **Some Elementary Problems in Veterinary Parasi-**

tology in the Philippines.—*Gaz. Bureau Anim. Indust. Philippine Is.* **3.** 76-79.

I. About 20 per cent. of stray dogs in Palestine are infected with echinococcus, but bovine infection is unexpectedly light (about 12 per cent.) and human infection rare. 80 per cent. of cattle imported from Cyprus are infected, but show a remarkably high proportion of sterile cysts.

T. spiralis is reported from the mongoose. On account of pork not being eaten by Jews and Mohammedans, human trichinosis is rare.

II. A general account is given of the harm to domesticated animals resulting from parasitic worms, and the advantages of a general parasitological survey and of work on the life histories of parasites are pointed out. *Cysticercus cellulosae* and *C. bovis* are both quite common in the Philippines, but the most important parasitological problem in the islands is the control of surra.—E. L. Taylor.

Clapham, Phyllis A. (1933). **On the Life-History of** *Heterakis gallinae*.—*J. Helminthol.* **11.** 67-86. 16 figs. [24 refs.]

This paper gives a good account of the nomenclature, distribution and morphology of *H. gallinae* and of the author's investigation into the life history. The eggs were found to reach the infective stage in 11 to 13 days, the infective egg containing the second stage larva. The second moult occurs in the caeca of the chicken about 48 hours after infection ; the third moult occurs after about 96 hours, the fourth after about 10 days and maturity is reached 22 to 24 days after infection. The various developmental stages are carefully described. Search was made for evidence of migration during the course of the development of the larva, reports of this occurrence having been made by several investigators. No trace of larvae could be found, however, in the lungs, trachea, liver or mucous membranes of the small intestine and caeca, and it is concluded that all the development takes place within the lumen of the intestinal tract.—E. L. Taylor.

I. Henry, A., & Masson, G. (1933). Onchocercose cervicale du Dromadaire· [**Cervical Onchocercosis in the Dromedary**].—*Bull. Acad. vét. France.* **6.** 208-213. 4 figs. [11 refs.]

II. Papadaniel, S. (1933). Sur un cas de vaginalite chronique, chez un mulet, due à Setaria equina. [**A Case of Chronic Inflammation of the Sheath in a Mule, due to** *Setaria equina*].—*Ann. Méd. vét.* **78.** 166-168.

I. From fragments of worms obtained from nodules in the anterior portion of the ligamentum nuchae of a dromedary, the authors have been able to add a few particulars to the scanty information which is available on the morphology of *Onchocerca fasciata*. The literature on the subject is also outlined.

II. An insensitive tumour the size of a pear was excised from the inguinal region of a mule. Three worms of the species *Setaria equina* were found in culs-de-sac at the attachment of the tumour to the sheath and it is thought that they must have been the cause of its development.—E. L. Taylor.

Schlegel, M. (1933). Die Lungenwurmseuche beim Dachs. [**Lungworm Disease of the Badger**].—*Berl. tierärztl. Wschr.* **49.** 341-344. 8 figs. [16 refs.]

An acute broncho-pneumonia observed in the badger is ascribed by the author to the presence of large numbers of a new species of lungworm. Hard fibrous and calcified nodules were found in the lung substance, where worms had died or masses of their eggs had become trapped. The worm is described under the name

Strongylus falciformis. [It obviously does not belong to the genus *Strongylus*, however, and the rather inadequate description suggests a new genus].

—E. L. Taylor.

Hoeppli, R., & Feng, L. C. (1933). **The Presence of an Anticoagulin in the Esophagus of Bunostomum trigonocephalum from the Intestine of sheep.** —*Arch. Schiffs- u. Trop.-Hyg.* **37.** 176-182. [7 refs.] [Orig. in English].

It has been shown by other investigators that a saline extract of the anterior portion of *Ancylostoma caninum* has a marked inhibitory effect upon the coagulation of blood. By means similar to those used in the earlier work and by a hanging drop method of their own, the authors have made observations on the action of extracts from the anterior portion of *B. trigonocephalum* and, after making numerous dissections, found that the anticoagulin principle is situated in the oesophagus and not in the cephalic gland. The potency of the extract was not nearly so great as that described as obtained from *A. caninum*. Extracts were also made from *Spirocerca sanguinolenta*, *Physaloptera clausa* and *Dirofilaria immitis* and from the anterior portion of *Schistosoma japonicum*, but were found to be devoid of anticoagulin.—E. L. Taylor.

Stumberg, J. E. (1933). **The Detection of Proteins of the Nematode Haemonchus contortus, in the Sera of Infected Sheep and Goats.**—*Amer. J. Hyg.* **18.** 247-265. 4 figs., 12 tables. [6 refs.]

It has been shown that, on repeated injection of proteins into dogs and guinea pigs, a rise in the number of eosinophiles in the circulating blood takes place. This has formed the basis of the method used in this paper to detect the proteins of *Haemonchus contortus* in the blood of its host and is essentially an anaphylactic test. *Haemonchus* protein was detectable in dilutions of 1 : 50,000. The test consisted of a rise in relative percentage and absolute number of eosinophilic leucocytes in the circulating blood following injection of extract into sensitized guinea pigs. Injection of anti-*Haemonchus* immune rabbit serum into unsensitized guinea pigs, previously injected with *Haemonchus* extract, caused a rise in percentage of eosinophiles as long as 17 days after the injection of extract. Sera of *Haemonchus*-infected sheep and goats injected intraperitoneally into actively or passively sensitized and control guinea pigs caused an occasional rise in relative percentage of eosinophiles in controls and always a rise in sensitized guinea pigs, whilst sera of helminth-free sheep and of sheep infested with nematodes other than *Haemonchus* failed to cause such a rise. It is concluded that *Haemonchus* proteins are absorbed through the alimentary tract into the circulating blood of heavily infested hosts to react with specific antibodies in an anaphylactic test.

—James Stewart.

Alexeieff, A. (1933). Sur les facteurs déterminant le développement des oeufs d'Ankylostomes. [**Factors Influencing the Development of Ancylostome Eggs**].—*Bull. Soc. Path. exot.* **26.** 930-934.

It is known that the eggs of ancylostomes do not hatch in the intestine owing to the high temperature and absence of oxygen. The author's experiments were directed to the necessity of oxygen for segmentation of the egg and formation of the rhabditiform larva. The species used was *Necator americanus*. He concludes that, for the formation of the larva, the lowering of the temperature is the indispensable factor and that the absence of oxygen does not hinder the development of the larva.

It is quite otherwise when the larvae are hatched, for most of them die

within six to eight hours and all are dead the next day. The method of hatching is described. There are some clinical observations and an account of the repeated feeding to a cat of dead female worms after being incubated to 28° to 30°C. for 22 to 24 hours. After the first feeding there was an indisposition which the author attributes to infection *via* the bronchi. Subsequent feedings caused no reaction which is explained by the presence of a degree of acquired immunity.

—A. W. N. Pillers.

McCoy, O. R., Miller, J. J., & Friedlander, R. D. (1933). **The Use of an Intradermal Test in the Diagnosis of Trichiniasis.**—*J. Immunol.* **24.** 1-28. 4 tables. [7 refs.]

A suspension of dried pulverized larvae was used as an antigen for the detection of trichiniasis by skin reactions as used by Bachman in 88 persons known to have suffered from the disease during the previous eight years. Of 36 recent cases, two to six weeks old, 92 per cent. gave a positive reaction to 1 : 500 antigen and 70 per cent. were positive to 1 : 10,000 antigen : of 39 cases, 3 to 22 months after infection, 80 per cent. reacted positively to 1 : 500 antigen and 49 per cent. to 1 : 10,000 antigen : of 13 cases of 1½ to 7 years standing, 62 per cent. reacted positively to 1 : 500 antigen and 23 per cent. to 1 : 10,000 antigen. Of a group of 104 control persons, 18 per cent. gave positive reactions to 1 : 500 antigen and 9 per cent. to 1 : 10,000 antigen ; of 92 persons infected with *Trichuris trichura*, 62 per cent. reacted positively to 1 : 500 antigen and 18 per cent. reacted positively to 1 : 10,000 antigen. The test cannot be considered to be definitely specific, but only as a valuable aid to diagnosis.—E. L. Taylor.

Bachman, G. W., & Molina, R. R. (1933). **Resistance to Infestation with Trichinella spiralis in Hogs.**—*Amer. J. Hyg.* **18.** 266-294. 7 figs., 1 table. [23 refs.]

After reviewing previous work on resistance to infestation with *Trichinella spiralis* in various animals, the authors describe the methods and material used in their experiments. Ten pigs—five males and five females, several weeks old, from two litters—were used. The experiments were continued for 345 days in the animals which survived. At intervals of five days the following procedure was carried out :—white blood cell counts, differential counts, tests for precipitins and estimations of haemoglobin. The first 20 to 40 days constituted the normal control period. Following this, the animals were infested by feeding a definite amount of trichinous meat. The reaction produced was studied for 80 days when a second infestation was brought about. These are referred to as the first and second periods of infestation. In some cases there was a third and a fourth period of infestation. Some animals were used as controls and others were immunized before and after infestation by intramuscular injections of a 1 per cent. *Trichinella* powder suspension. These constitute immunization periods. Biopsies were made on each pig after each feeding.

The methods of making blood counts, the standardization of the methods of infestation, antigen preparation, immunization, faecal examination and haemoglobin determination are described.

The symptoms of infestation were severe diarrhoea, prostration, loss of appetite, frothy discharge from the mouth and stiffness of the muscles, especially those of the jaws and hind limbs. After second feedings the symptoms were less pronounced with the exception of the diarrhoea and loss of appetite.

Then follows a detailed account of the findings in each of the experimental animals. From these the authors make the following observations.

At the end of the experiments five pigs were alive and five had died (one from fighting). In five pigs on the first infestation there was a decided increase in the percentage of eosinophilic cells and in the production of precipitins. During the second infestation the rises were as a rule less than in the first. In two pigs there was a slight rise in precipitin titre during the first immunization period, but no decided change in the percentage of eosinophiles. During the second immunization period there was a decided increase in the percentage of eosinophiles, but only a slight rise in the precipitin titre. Clinical resistance to hyperinfestation with *Trichinella* is not correlated with the production of high eosinophilia and high precipitin titre. Repeated feedings of 550 g. of trichinous meat, containing four to five larvae per microscopic field, did not increase the number of larvae in striated muscles. This seems to indicate that the intestinal worms were unable to reach maturity or were unable to deposit their larvae in the blood stream, due to an intestinal barrier which seems to have been established. In five animals that survived there was a decided eosinophilia (highest 32 per cent.) and a high precipitin titre (1 : 6,000) during the first infestation, but a rapid decrease in eosinophiles and a total absence of precipitins in subsequent infestations. Immunization previous to infestation afforded no protection .

The authors believe that the resistance to hyperinfestation is due to a retention of antibodies and a local mobilization of leucocytes and cells of the reticulo-endothelial system in the intestinal wall of the host.—A. W. N. Pillers.

Morgan, D. O. (1933). **The Effect of Heavy Stocking on the Worm Burden under a System of Rotational Grazing.**—*J. Helminthol.* **11.** 169-180. 4 figs., 1 plate. [5 refs.]

By egg counts carried out at fortnightly intervals and finally by *post-mortem* examination, Morgan has compared the progress of infection with trichostrongyloid worms in goats pastured in the ordinary way with goats pastured according to the " New System of Grassland Management," whereby the grazing area was divided into plots, each being rested and grazed in turn. His observations allow him to come to the provisional conclusions that rotational grazing tends to diminish the risk of helminthic infestation, that heavy stocking is dangerous, even during the winter months when the grass becomes scarce and that *Chabertia ovina* and the smaller trichostrongyles appear to be more prevalent than *Haemonchus contortus* in the winter months.—E. L. Taylor.

Schwartz, B., Imes, Marion, & Wright, W. H. (1933). **Parasites and Parasitic Diseases of Horses.**—*U.S. Dept. Agric. Circ.* No. 148. pp. 54. 86 figs. [8 refs.]

This is a revision of the now well-known official bulletin by these three authors from the Zoological Division of the Bureau of Animal Industry. Among other aspects, it deals with general control, medical treatment, protozoa, flukes, tapeworms, roundworms, bots, disposal of manure, lice, the mange mites, ticks, fumigation and dipping. There are over 80 figures, illustrating various species of worms, lesions, affected animals, life cycles, dipping plant, lice and acari. Although intended for farmers, the pamphlet is an epitome of the present state of applied entomology and helminthology of the permanent parasites of the horse in America. With the exception of the portion relating to the spinose ear tick, *Ornithodorus megnini*, the work might equally apply to European horses.—A. W. N. Pillers.

IMMUNITY.

Böhmig, R. (1933). Ueber Beziehungen von Ueberempfindlichkeit und Immunität bei experimentellen Streptokokken-Infektionen. [**Hypersensitiveness and Immunity in Streptococcal Infection**].—*Klin. Wschr.* **12.** 258-262. 3 figs.

Thirty rabbits were given a course of injections of a green streptococcus of very low virulence (V 110 A), the injections being made intravenously with killed followed by living organisms until a high agglutination titre had been produced. Two other groups of 30 rabbits were inoculated similarly with S 43, a moderately virulent haemolytic streptococcus. A fourth group was " sensitized " with small doses of living culture of the strain of low virulence (V 110 A) by the intracutaneous route. A fifth group was left uninoculated.

Each of these groups was then tested by injecting intracutaneously small doses of the slightly virulent strain V 110 A, the animals of the fourth or " sensitized " group, being tested with 1/100 of the dose used for the other group. Each animal was injected at 6 or 7 different sites on the shaved skin of the back, one of which was removed each day for histological examination.

The animals of the fourth group, " sensitized " by intracutaneous injection of the homologous organism, showed a more pronounced and more sustained reaction than the control group or the group which was immunized by intravenous injection of the homologous organism. The reaction was also more marked in the groups which were heterologously immunized. Intracutaneous tests were also carried out with the two other strains used, S 43 and P 230. The results obtained were less clear-cut, but were of the same general character.

In a second series of experiments, made with the strains V 110 A and S 43, a comparison was made between the local response to the intracutaneous test and the general antibody titre, measured by the agglutination and precipitation tests. It was found that, before the titres had risen notably, there was a period of increased sensitivity (hyperergy), that this sensitivity declined as the antibody titre rose, but again became marked when the antibody was allowed to drop. These findings are schematically displayed, allergy being shown as composed of a preliminary hyperergic period, a period of immunity with high antibody titre, and finally a second hyperergic period.

The hypersensitivity was shown not only by the intensity of the intracutaneous reaction but by the death from shock, during this sensitive period, of about a quarter of the animals after injection of 1/10 to 1/5 of the usual lethal dose. This hypersensitivity was not specific, but was manifested towards a different streptococcus and towards certain other proteins.—A. W. Stableforth.

I. Clawson, B. J. (1933). **Relation of Allergy to General Resistance in Streptococcic Infection.**—*J. Infect. Dis.* **53.** 157-164. 1 fig. [17 refs.]

II. Hodge, B. E., & Swift, H. F. (1933). **Varying Hemolytic and Constant Combining Capacity of Streptolysins; Influence on Testing for Antistreptolysins.**—*J. Exp. Med.* **58.** 277-287. 5 tables. [8 refs.]

I. Experiments were devised to ascertain whether the allergic state bore any harmful or useful relation to the process of general protective resistance to streptococcus infection. A series of rabbits were made hypersensitive to streptococci and another series made highly resistant without the development of the allergic state. The rate with which living streptococci were removed from the blood and liver following intravenous injection was compared in these two groups and in normal animals. The findings suggest that the allergic state is not necessary in the develop-

ment of general resistance to streptococci and may at times be a harmful phenomenon.

II. The haemolytic titre of a given streptolysin varies considerably within a short period, while its power of combining with antistreptolysin is constant under certain conditions. The author describes a method of preparing a streptolysin of constant combining capacity which may be used for testing the antistreptolysin content of sera over a considerable period.—S. J. Edwards.

I. Birkhaug, K. E. (1933). Durée de l'allergie cutanée produite par des Bacilles tuberculeux avirulents vivants ou morts. [**The Duration of Cutaneous Allergy following the Injection of Living or Dead Avirulent Tubercle Bacilli**].—*C. R. Soc. Biol. Paris.* **113.** 857-860. 2 tables. [3 refs.]

II. Boquet, A., & Bretey, J. (1933). Sur le développement de l'allergie provoquée chez le Cobaye par les Bacilles tuberculeux atténués ou par les Bacilles morts. [**The Progress of Allergy in the Guinea Pig Injected with Attenuated or Killed Tubercle Bacilli**].—*Ibid.* 1126-1129. 1 fig. [6 refs.]

III. Boquet, A., & Valtis, J. (1933). Sur l'activation des réactions homéotopiques à la tuberculine chez les Cobayes tuberculeux. [**Activation of Previous Sites of Reactions in Tuberculous Guinea Pigs**].—*Ibid.* 1130-1132. [1 ref.]

IV. Boquet, A., & Bretey, J. (1933). Sur le développement de la tuberculine dans les cultures en bouillon glycériné et en milieu synthétique de Sauton. [**Production of Tuberculin in Glycerine Broth and Sauton's Medium respectively**].—*Ibid.* 1412-1415. 1 fig., 1 table. [1 ref.]

I. Birkhaug has determined that the duration of cutaneous allergy in the tuberculous guinea pig is about 24 weeks with dead organisms (10 mg. doses), whereas responses were still discernible at the 36th week with living strains of low virulence (0·001 mg. doses).

II. After the injection of fully virulent *Mycobact. tuberculosis*, allergy developed about the eighth day and then augmented rapidly. With attenuated or dead organisms, the initial reaction occurred about the same period, but the degree of sensitivity to subsequent inoculations increased at a much lower rate.

III. Repeated injections of tuberculin in the guinea pig both during the pre-allergic stage and during the stage of sensitivity induced only a slight modification of the reactions, with a slightly more marked susceptibility to necrosis.

IV. Parallel experiments with tuberculins prepared in glycerine broth and Sauton's medium respectively, over periods varying from eight to 50 days, showed that for the production of the lethal fraction, Sauton's medium gave the better results, while for the intradermal fraction the two methods were about equal in value. Filtered tuberculin was five times as active as the same filtrate heated to 120°C. for half an hour.—R. E. Glover.

Pröscholdt, O., & Pinkepank, H. (1933). Versuche über den Ausbau des Tuberkulosebekämpfungsverfahrens unter Zuhilfenahme der Tuberkulinisierung. [**The Use of Tuberculin in the Control of Tuberculosis**].—*Deuts. tierärztl. Wschr.* **41.** 579-585. 1 table. [4 refs.]

Recognizing in the first place that slaughter of all reactors to tuberculin is impracticable, the authors discuss the value of tuberculin as an aid to the detection of those animals which are actually excreting tubercle bacilli.

The following steps in the eradication of tuberculosis are recommended :—(1) the removal of all clinical cases ; (2) the examination of bronchial mucus from all suspect animals and, later, the eradication of udder, uterine and intestinal

tuberculosis ; (3) a tuberculin test and more rigorous examination of all reactors to determine which are actually excreting tubercle bacilli ; (4) the removal of all reactors and careful bacteriological examination of any new suspects and (5) retesting and the usual precautions to keep a herd free from tuberculosis.

The authors' observations, which are detailed, relate to 21,055 cattle. As a result of a clinical examination accompanied by bacteriological examination of bronchial mucus from all suspected animals, 3·82 per cent. were picked out as excretors of tubercle bacilli. Examination of bronchial mucus from those tuberculin reactors which were not previously suspected was, however, the means of detecting a further 3·53 per cent. of excretors, making a total of 7·35 per cent.

The fact that a large number of animals in whose bronchial mucus tubercle bacilli are found seem to be resistant, and show little or no tuberculosis of the lungs, is also discussed.—A. W. Stableforth.

Plum, N. (1933). Fjerkraetuberkulosens Betydning som Fejlkilde ved Tuberkulinprøver hos Kvaeg. [**Importance of Avian Tuberculosis as a Source of Error in Tuberculin Tests on Cattle**].—*Med. Stat. Vet. Serumlab. Copenhagen.* No. 135. pp. 16. 2 tables. [12 refs.] [Summary in German : abst. from orig.] [Paper presented at 4th Nordiske Veterinarmötet, Helsingfors, Finland, 1933].

A reference is made to the reports in the literature of cases of avian tuberculosis in human beings, horses, sheep, roe-deer, rabbits and kangaroos, published since the author's monograph on the subject in 1925. On the basis of previous work, a survey is then given of the nature of the avian infection in cattle, which occurs frequently ; great importance lies in the fact that it gives a reaction with bovine tuberculin. The tuberculin sensitiveness seems to abate about 6 to 12 months after the source of infection (tuberculous fowls) has been removed. Material from the island of Bornholm collected by the veterinary directorate and adapted by Christiansen shows that about 8 per cent. of the 3,800 herds on the island contains individuals that react owing to avian infection. About 1·5 per cent. of the 61,000 head of cattle on the island showed avian reaction.

When the diagnosis of infection with avian tubercle bacilli has been established, the animal can remain in a herd that otherwise is free from tuberculosis without any danger of spread of the infection.—H. C. Bendixen (Copenhagen).

Granata, G. (1933). Bacilli tubercolari avirulenti e " Esotubercolina Finzi " (E.T.F.). [**Avirulent Tubercle Bacilli and " Esotuberculin Finzi " (ETF)**].—*Profilassi.* **6.** 117-119. [5 refs.] [Summary in French : abst. from orig.]

A study of the avirulent acid-fast bacillus of Puntoni has shown that it is incapable of producing an esotuberculin, although its cultural and morphological properties resemble those of a true tubercle bacillus. On subcutaneous injection, it produces a local abscess but no generalized effects are seen. It is thought that this bacillus has undergone a series of changes which have altered its biological properties, so that eventually it has become completely saprophytic.

—J. A. Nicholson.

I. Valcarenghi, M. E. (1933). L'" Exotuberculine " (E.T.F.) obtenue au moyen de la souche bovine " Vallée," dans le diagnostic de la Tuberculose des Bovins. [**" Esotuberculin " prepared from *Mycobact. tuberculosis* (Vallée) in the Diagnosis of Bovine Tuberculosis**].—*Bull. Acad. vét. France.* **6.** 256-262. [15 refs.]

II. Goret, P., & Zeitoun, E. (1933). L'anaexotuberculine. [**Esotuberculin**]. —*Rec. Méd. vét.* **109.** 513-518. [24 refs.]

I. An unheated tuberculin prepared according to the method of Finzi (filtration of the clear formalinized fluid from young glycerine broth cultures) was obtained from a fully virulent bovine strain (*M. tuberculosis* Vallée). The product was tested on 50 cattle in a heavily infected herd by the intramuscular injection of 2 c.c. All the tested animals, irrespective of their condition and the severity of the disease, gave very clear-cut reactions (increases in temperature of 2·1° to 2·6°C). The reactions developed more rapidly than with old tuberculin ; for example, in 20 per cent. the maximum rise was reached by the tenth hour and in every case a response was in evidence between the sixth and eighth hours.

II. Goret and Zeitoun review the literature on the employment of esotuberculin. They used the product in two infected herds and claim that not only were the temperature reactions more clear-cut than with ordinary tuberculin, but that a retest after an interval of three days produced intense responses in the positive cases.—R. E. Glover.

Karsten. (1933). Ueber den serologischen Nachweis der Eutertuberkulose und dessen Verwendbarkeit bei der Durchführung des freiwilligen Tuberkulosebekämpfungsverfahrens und der Vorzugs- und Markenmilchüberwachung. [**Serological Diagnosis of Udder Tuberculosis**].—*Deuts. tierärztl. Wschr.* **41.** 561-566. 1 table. [6 refs.]

Pröscholdt, Rautmann, Scharr, & Schumann. (1933). Milchserologische Untersuchung zur Feststellung der Brauchbarkeit des Komplementbindungsverfahrens für die Erkennung der Eutertuberkulose und die praktische Auswertung der Ergebnisse für das staatlich anerkannte Tuberkulosebekämpfungsverfahren. [**Serological Diagnosis (Complement-Fixation) of Udder Tuberculosis**].—*Ibid.* 566-570. 1 table.

A series of reports delivered to the Conference of Directors of the Bacteriological Institutes of the Prussian Departments of Agriculture by Karsten, Pröscholdt, Rautmann, Scharr and Schumann on the value of the complement-fixation method, carried out with whey, as a means to the diagnosis of udder tuberculosis—followed by a discussion. For details of the methods used and of the work of each reporter the original should be consulted.

In general, a negative complement-fixation result meant absence of infection, whereas a positive result, though indicating tuberculosis of the udder in about one-third to one-half of the cases, was also frequently found to be associated with advanced tuberculosis elsewhere in the body or to be of a non-specific nature.

About 10 to 20 per cent. of samples of milk could not be examined serologically because no whey was obtainable or because the whey was itself anticomplementary.

Excluding these samples, 80 to 90 per cent. of specimens of whey from individual quarters which showed tubercle bacilli by microscopic or biological examination, fixed complement, usually to a marked degree. Dilution with the milk of non-infected quarters or animals reduced the percentage of positive results considerably, a dilution of even 1 : 3 preventing fixation in many cases.

Of the samples which gave a positive complement-fixation test, about one-third were also shown to contain tubercle bacilli by microscopic examination whilst guinea pig inoculation gave positive results in a further 20 to 25 per cent. of those which were tested in this manner ; i.e. fixation of complement could be shown to indicate tuberculosis of the udder in one-third to one-half of the cases in which it occurred. In a smaller proportion of cases it was shown to be associated with advanced tuberculosis or with tuberculosis of another quarter of the udder

and the presence of complement-fixing antibody in the blood, whilst in the remaining 10 or 20 per cent. of cases it was associated with causes unrelated to tuberculosis (brucella infection, mastitis, etc.).

Several antigens were tested, the two most commonly used being tuberculin and the acetone-lecithin and ethyl-formate antigens used by BELLER. The latter antigens detected a greater proportion of cases of tuberculosis and were of more constant potency than tuberculin. They were on the other hand less specific.

—A. W. STABLEFORTH.

DUNKIN, G. W. (1933). **The Preparation of Johnin from a Synthetic Medium without the Addition of** *B. phlei*.—*J. Comp. Path. & Therap.* **46.** 159-164. 4 figs. [7 refs.]

The application of the double intradermal johnin test, using the preparation previously described by the author [(1928). *J. Comp. Path. & Therap.* **41.** 94.] has proved of considerable assistance in the detection of cases of Johne's disease. The occurrence of an appreciable non-specific swelling in negative animals is a drawback and, with a view to its elimination, Dunkin has prepared johnins on a less complex medium. The liquid selected was that of Henley, containing dried *B.* [*Mycobact.*] *phlei*. The first cultures yielded very meagre growths, but after the sixth generation a satisfactory multiplication was obtained. From this culture two series were initiated, one with and the other without *M. phlei*. The author states :—

" by the end of two and a half months growth was apparent in the flasks containing *B. phlei* and by three months it was seen to be continuing. As yet, however, no evidence of multiplication could be detected in the flasks without *B. phlei*, and it was not until the lapse of three and a half months that definite signs of growth in these flasks was seen . . . . . it was not until the expiration of four and a half months that the surface of the medium in the majority of the *B. phlei* flasks was completely covered with growth. At this stage none of the other flasks had advanced to that extent, and on the best of them the growth was not quite half the area of the fluid surface ; in the others the area covered was less extensive."

Both series were filtered and evaporated to one-tenth of their volume. They were then tested on two animals positive to johnin and negative to tuberculin, and on two negative to both. Although the johnins were not of high potency, they produced clear-cut, diffuse reactions in the positive animals, while in the non-reactors the swellings were much less pronounced than with the older form of johnin. The importance of preparing johnins in synthetic medium free from acid-fast organisms or their extracts is stressed.—R. E. GLOVER.

OKUBO, K. (1933). Experimentelle Studien über die perorale Immunisierung mit Bact. pullorum. [**Peroral Immunization with** *Bact. pullorum*].—*Zlb. Bakt. I.* (*Orig.*). **129.** 350-365. 13 tables. [16 refs.]

Antisera prepared by injection into rabbits of killed suspensions of *Bact. pullorum* contain agglutinins and bactericidins against *Bact. pullorum* and *Bact. typhosum*. Feeding rabbits with killed bacterial substance in doses of 60 mg. gives rise to similar antibodies. [From the work of BRUCE WHITE it is known that *Bact. pullorum* and *Bact. typhosum* share a common O (somatic) antigen].

—E. J. PULLINGER.

RAMON, G., & LEMÉTAYER, E. (1933). Sur l'immunité antitétanique naturellement acquise chez les animaux d'espèces bovine, ovine et caprine. Son existence. Son mécanisme. Essais d'immunologie comparée. **[Naturally Acquired Antitetanic Immunity in the Bovine, Ovine and Caprine Species].**—*Bull. Acad. vét. France.* **6.** 183-192. 4 tables. [14 refs.]

In this communication the authors give a more detailed account, supported by experiments, of their investigation, the substance of which was included in a previous publication [this *Bull.* **4.** 114].—Gwilym O. Davies.

Miles, A. A. (1933). **Optimal Proportions in Agglutination : With Reference to the Antigenic Analysis of the *Brucella* Group of Organisms.**—*Brit. J. Exp. Path.* **14.** 43-55. 4 figs., 5 tables. [17 refs.]

Three methods of titrating antigen and antibody, each yielding an independent value, are described :—(1) a constant suspension of antigen and varying quantities of serum are left in contact for 24 hours. The minimum amount of serum which induces particulation is referred to as the constant antigen end-point ; (2) by a similar titration the amount of serum necessary to cause particulation in a minimum time interval is determined ; that is, the constant antigen optimum and (3) antigen is titrated against a constant concentration of antiserum and the concentration of antigen which first shows evidence of particulation is accepted as the constant antiserum optimum. This occurs at the point where the bacteria in the suspension are in such concentration that the opportunity of approach is greatly enhanced. The occurrence of particulation in suspensions of high concentration is retarded owing to an insufficiency of antiserum to cause saturation of the antigen.

Certain mathematical relations exist between these three values. In the antigenic analysis of *Br. abortus* it is found that the amount of serum necessary to cause particulation in a minimum time interval is 16 times greater than the constant antigen end-point, and that the amount of serum in a constant antigen optimum is reduced to one-quarter when the bacterial suspension is at the constant antiserum optimum. In discussing the results of the application of these titrations to the brucella group the author finds that they are consistent if it is assumed that all members of the group contain two antigens, and that one is abundant in *Br. abortus* and the other in *Br. melitensis*. These two organisms could be differentiated by the titration, but porcine strains could not be differentiated from *Br. abortus*.

—R. S. Roberts.

Legroux, R. (1933). Nouvelle méthode de vaccination par les " Anabactériens." [**New Method of Vaccination by " Anabacteria "**].—*Presse méd.* Jan. 21st. 118-119.

In this paper the author recounts his experimental work with a new form of vaccine. The vaccine consists of a formalinized filtrate of organisms which have undergone transmissible lysis, lysis being in his experience due to a diastase. Such formalinized filtrates he calls " anabacteria," as they are subjected to formalin in a similar way to " anatoxins."

By means of anabacterial preparations of the organisms concerned, the author has successfully vaccinated guinea pigs against glanders and plague. By means of the glanders preparation he was also able to prevent the progress of the disease in experimentally infected animals and to prepare an efficacious anti-bacterial serum.—Gwilym O. Davies.

Eastwood, A. (1933). **The Nature of Antibodies.**—*J. Hyg. Cambridge.* **33.** 259-281. [6 refs.]

A general review of the origin and nature of antibodies. The author suggests a middle course between Ehrlich's theory, which he regards as untenable, that all antibodies are existent within some cells of the animal to be immunized, and the other extreme, viz. that the antigen does not act as a cellular stimulus, but combines directly with the blood proteins. He agrees that the cells participate

in some way in antibody formation, but finds it difficult to believe that the latter is manufactured by cells as an internal secretion which is liberated into the circulation. He offers the hypothesis that, as a result of changed cellular activity, antibodies are formed by a modification of the plasma by filtration, probably through capillary endothelium which has adsorbed the antigen. These views are elaborated by references to specificity, irregularities of antibody formation, the part played by complement and similar factors.—R. E. Glover.

Deambrogio, L. (1933). Le trasfusioni di sangue dall'animale all'uomo. [**Blood Transfusion from Animals to Human Beings**].—*Profilassi.* **6.** 166-169.

Experiments have shown that blood transfusion between animals of the same and of different species may be safely undertaken. Horse blood is the most suitable for transfusion into both man and the lower animals. The venous blood of the donor is obtained under aseptic conditions and diluted 1 : 3 or 1 : 2 with physiological saline. 1 c.c. of a 10 per cent. solution of sodium citrate is added to every 100 c.c. of diluted blood and the addition of one drop of adrenalin to each 50 c.c. of the mixture is an advantage. Up to 120 c.c. may be given intravenously to a 15 kg. dog at one injection.

Accidents are usually the result of injecting the blood too rapidly. An injection should take not less than five minutes. Agglutination is usual when horse and dog bloods are mixed, but the author has never observed harmful effects from this cause. Haemolysis may occur independently of or together with agglutination, but serious accidents as a result of haemolysis do not occur frequently.

In veterinary medicine blood transfusion is indicated in such conditions as acute haemorrhage, surgical shock, anaemia, eczema and many forms of dermatitis. —J. A. Nicholson.

DISEASES, GENERAL.

Leclainche, E. (1933). La situation sanitaire en 1932. [**The Sanitary Position in 1932**].—*Bull. Off. internat. Epiz.* **7.** 1-28. 2 graphs, 21 maps.

Leclainche, E. (1933). Examen de la situation sanitaire. [**The Sanitary Position**].—*Ibid.* 276-287. [Papers presented at Meeting of the Committee of the Off. internat. Epiz. Paris, 1933, followed by discussion].

The Director of the Office international des Epizooties reviewed the present situation with reference to the various diseases.

Foot and Mouth Disease.—Attention was called to the renewed outbreaks followed by lulls preceding further outbreaks. The question arises whether these lulls are due to an immunity set up in those animals which had been previously attacked, but this is difficult to believe owing to the plurality of types of the disease. Birds continue to be suspected carriers. The situation in Europe was more favourable at the beginning of 1932 except in Germany, Denmark, Belgium and Holland. In Germany outbreaks rose to 2,367 and then decreased to 128. In Denmark they rose to 1,994 and decreased to 1,675. In Belgium and Holland they rose to 2,909 descending to 2,307. Great Britain received great credit for its methods of dealing with outbreaks.

Sheep Pox.—This disease is described as occurring chiefly in France, Hungary, Italy, Spain, Greece, Turkey, U.S.S.R. and Yugoslavia.

Anthrax is described as diminishing in all, or nearly all, countries. For some unexplained reason the disease seems to have increased in many countries about the years 1925 to 1931, and then decreased. It appears to be most frequent in Czechoslovakia, Hungary and Yugoslavia. Statistics for each country showed

the origins of the infection. Prof. MÜSSEMEIER and Sir Ralph JACKSON presented useful documents. Vaccination has done much, but it is difficult to explain periodical outbreaks. It is suspected that infection is carried *via* the food supply.

BLACK-LEG.—A number of countries do not furnish figures in their reports. Some countries appear to have many outbreaks which vary in different regions, due probably to the use or non-use of vaccines or to the virulence of the blackleg organism in the soil.

SWINE ERYSIPELAS.—The porcine stock in every country seems to be more or less affected, but the disease can be efficaciously controlled by the use of vaccines and serum.

HAEMORRHAGIC SEPTICAEMIA.—The list of diseases which can be correctly described under this heading requires revision.

SWINE FEVER.—The diseases classed under this heading also require revision because some countries class all the " maladies rouges " under this term, e.g., swine erysipelas, swine fever and swine plague.

CONTAGIOUS BOVINE PLEURO-PNEUMONIA.—This disease appears to be nearly extinct in Europe. Spain alone reports that the disease existed in 299 communes ; the U.S.S.R. had 12 outbreaks.

GLANDERS.—This disease is gradually being exterminated and has disappeared entirely from Belgium, Denmark, Estonia, Finland, France, Great Britain, Ireland, Latvia, Lithuania, Norway, Sweden, Japan and Tunis. It is nearly extinct in Germany, Austria, Hungary and Czechoslovakia. It still exists in Italy, Greece, Spain, Turkey, Poland, U.S.S.R., Algeria, Yugoslavia and Syria.

DOURINE.—This disease is occasionally observed in Spain, Poland, Turkey and Bulgaria.

RABIES.—This disease does not exist in Belgium, Ireland, Great Britain, Norway, Holland, Sweden and Switzerland, but it is not uncommon in Finland, Turkey, Greece, Lithuania, Tunis, Germany, Morocco, Czechoslovakia, Algeria, France, Italy, Latvia, U.S.S.R., Hungary, Yugoslavia and Poland.

TUBERCULOSIS.—Statistics are not available, but any figures produced show an extreme gravity in many countries and the enormity of the task of prophylaxis seems to explain the timidity of intervention.

OTHER DISEASES requiring immediate attention are piroplasmosis, Johne's disease, Bang's disease, infectious diseases of horses, mammitis, Borna disease, meningo-encephalitis, cerebrospinal meningitis, Aujeszky's disease and bovine lymphadenosis ; also poultry diseases—fowl plague, fowl diphtheria, fowl pox and *Bact. pullorum* infection.—T. DUNLOP YOUNG.

MITCHELL, W. M. (1933). **Some Aspects of the General Osteo-Arthritic Problem in the Horse.**—*Vet. Rec.* **13.** 918-924. 2 tables. [1 ref.]

This is essentially a progress report of about four years investigational work on the skeletal pathology of heavy draft horses, particularly of 14 animals affected with shivering which were slaughtered and examined carefully *post mortem*. The essential lesions found are set out in the first table and a second table gives similar results for five riding horses which suffered from partial paraplegia (" jinked back "). It has been found that there is a close clinical connection between shivering, stringhalt and osteo-arthritic lesions in heavy horses, the latter being present in the large majority of old horses and also in many very young animals.

The author believes that shivering, stringhalt and partial paraplegia are merely symptoms of a generalized osteo-arthritic condition and his evidence goes far to support this view. The spinal cord and main nerve trunks of the limbs were examined macroscopically and microscopically in the 19 cases under discussion

and in many cases were found to show a degenerate condition with a decrease in the nerve fibres and an increase in connective tissue. The commonest lesion found was congestion with degeneration of the sciatic nerve at its bend over the hip joint.

With regard to pathogenesis, the author has advanced a few theories, notably postulating nutritional deficiency as a fundamental cause and supposing that some chemical metabolic product may be the exciting cause of the widespread skeletal changes.—J. E.

I. Hammond, J. (1933). **Factors Producing Sterility, with Special Reference to Genetic Causes.**—*Proc. Roy. Soc. Med. London.* **26.** 1183-1185. 2 tables. [14 refs.]

II. Parkes, A. S. (1933). **Sterility in Relation to Endocrine Deficiency.**—*Ibid.* 1185-1187.

III. Korenchevsky, V. (1933). **Sterility in Males on Diets Deficient in Vitamin A or Vitamin E.**—*Ibid.* 1187-1192. 6 figs. [4 refs.]

IV. Edwards, J. T. (1933). **Infectious Sterility in the Larger Domesticated Animals.**—*Ibid.* 1192-1210. 11 tables. [47 refs.]

[Papers presented at a discussion on Sterility at a Meeting of the Section of Comparative Medicine of the above Society, April 26th].

I. Hammond summarized the physiological and genetical knowledge on fertility in animals with special reference to ovulation, fertilization and embryonic development. The paper is based mainly upon experimental work on laboratory animals, fowls and sheep. In mammals ovarian activity is governed by the anterior pituitary, whose hormone only becomes available for the ovaries after growth is nearly over or during the absence of a corpus luteum.

The successful fertilization of ova depends mostly upon the time of copulation in relation to the occurrence of ovulation. For instance, mares are most likely to become pregnant if served between the second and sixth days before the end of the oestral period.

II. Parkes discussed fertility and sterility from the endocrine aspect, dealing with the activity of the anterior pituitary body and ovulation, and the connection between corpus luteum and gestation.

III. Korenchevsky described the results of experimental work on male rats which were fed on diets deficient in vitamins A or E. Both these avitaminoses caused a degeneration of the testes.

IV. Edwards gave a valuable critical review of the literature on sterility in the mare and the cow. The various well-known schools of thought—the infectious vaginitis school, the Swiss school (Zschokke and Hess), the Danish school (Albrechtsen and Nielsen) and the American school (Williams)—are discussed. Edwards is of the opinion that granular vaginitis is not a pathological condition and is not a cause of sterility. He considered that the Swiss school laid too much stress on the ovary as a cause of disease, that the Danish school similarly laid too much stress on the uterus, whilst the school led by Williams in the U.S.A. is criticized for bad bacteriology and praised for its insistence upon the importance of hygiene during the whole life of the breeding female.

The aetiological connection between bacterial species and sterility in mares is then discussed : it is concluded that in many cases the bacterial theory of aetiology cannot be accepted.

Bovine sterility is discussed from the point of view of male and female sterility with reference to organic disease of parts of the genital tract ; this section contains much condensed information. Work from Denmark, Germany, New Zealand

and South Africa has shown the importance of endometritis and cervicitis as a cause of sterility.

Work on sterility in relation to contagious abortion indicates that the latter does not lead to a great increase in the former, but, like other infectious diseases, does weaken resistance, thus predisposing to the occurrence of genital disease.

Venereally transmitted diseases of horses and cattle are described ; they include coital exanthema of cattle, trichomonad infections of cattle, infectious metritis of mares caused by *Encapsulatus genitalium* and streptococcal cervicitis of cattle.—J. E.

STUHLENMILLER, M. (1933). Angeborene und erworbene Anomalien pathologisch-anatomischer Natur am Geschlectsapparat des Rindes. [**Congenital and Acquired Deformities of a Pathological Anatomical Nature in the Sexual Organs of Cattle**].—*Tierärztl. Rdsch.* **39.** 377-380. 4 figs. [3 refs.]

Congenital malformations of the genital organs are due to the faulty development of the Müllerian ducts and in such cases the animal may be permanently sterile or at least a difficult parturition is experienced. In one case, the uterus of a cow consisted of two completely separated cavities each with a cervix, but having a common vagina. A calf developed normally in the left horn but, on account of the narrowness of the left uterine os, parturition was impossible without assistance. A single uterine body with a double os is more frequently met with than the malformation described above. A pseudohermaphrodite showed at birth an udder the size of a head. At slaughter, four weeks later, the udder had atrophied somewhat and two testicles were discovered in the inguinal canal.

The author considers that cystic degeneration of the ovaries is not necessarily a primary condition, but more commonly follows such diseases as metritis, *Br. abortus* infection, etc. Tuberculosis may affect the genital organs and give rise to sterility. The best means of combating sterility is to pay strict attention to hygiene, housing, feeding and the general health of the animals.—J. A. NICHOLSON.

TONGIO, S. (1933). **Foot Rot in Carabaos and Abbreviated Tails.**—*Gaz. Bureau Anim. Indust. Philippine Is.* **3.** 12-13.

During a visit of the author to certain districts in the Philippine Islands he was struck by the varying lengths of the tails of most of the carabaos [water buffaloes], a condition which he later discovered to be a result of measures adopted by the owners to check the progress of a disease known as " lipunga," a local term for " foot-rot," which in many cases also affects the tail.

Foot-rot in carabaos is enzootic in certain districts which are very low-lying and badly drained. The farmers regard it as the inevitable concomitant of the rainy season (October to December). The feet of the animals are first of all affected, the lesions frequently becoming very extensive, leading to prostration, inanition and death. In a number of cases the tail is also involved and it is in order to arrest the progress of the disease that amputation is performed. The majority of animals recover under treatment, which consists of paring and cleaning the feet and of the application to the tissues of a disinfectant such as cresol. For animals in the early stages, cleaning and soaking the feet in brine seems to be an effective remedy.

There is no agreement as to the precise cause of the condition. Some claim a streptococcus as the causal agent whereas others consider it to be a species of actinomyces. KELSER states that *Actinomyces necrophorus* is prevalent in such localities and frequently enters the tissues through minor wounds.

—GWILYM O. DAVIES.

Beijers, J. A. (1933). Bloedwateren bij Paard en Rund. **[Redwater in Horses and Cattle].**—*Tijdschr. Diergeneesk.* **60.** 474-479 and 522-529. [9 refs.]

The cause of redwater is very often not known. The author discusses clinical cases described in veterinary literature and describes many cases which he has himself studied. He mentions haemoglobinuria occurring in young calves in the autumn and says that it is caused by cold water or by the food. He refers to the chronic haemolytic icterus with intermittent haemoglobinuria in horses, described by Bendixen and Carlström in Copenhagen, where bone marrow hyperplasia was found to be a prominent lesion. He discussed also the so-called puerperal haemoglobinuria in cattle seen in different countries and minutely described by Hjärre [(1930). *Acta path. et microbiol. scand. Suppl.* No. VII.] ; intensive lactation and wrong food are considered to be predisposing factors.

—A. Klarenbeek (Utrecht).

I. Jones, F. S. (1933). **Infectious Diarrhea (Winter Scours) of Cattle.**—*Cornell Vet.* **23.** 117-122. [9 refs.]

II. Haupt, H. (1933). Ein Versuch zur Bekämpfung der durch Kolibazillen verursachten Ruhr der Kälber. **[Control of Coliform Calf Diarrhoea].**—*Tierärztl. Rdsch.* **39.** 524-528. 1 table. [11 refs.]

I. This is a specific disease occurring in New Jersey and in some other American states, caused by an actively motile vibrio attacking the small intestine. In some herds the disease spread rapidly, and every adult over one year old scoured within seven days. The outstanding symptom is diarrhoea; the faeces are dark in colour and large quantities of blood or blood-stained mucus may be passed. There is little or no elevation in temperature, but in dairy herds the milk yield drops markedly. The course of the disease is short and the mortality low. *Post-mortem* examinations reveal a moderately reddened, swollen and oedematous mucous membrane of the lower duodenum and jejunum. The musculature is dry and the liver orange-coloured.

Experimentally, the disease can be reproduced by feeding infective faeces or cultures of the vibrio to cows or vigorous calves. Apparently little immunity results from an attack, as the disease may reappear in the same herd year after year. This is believed to be due to the fact that the vibrios obtained have belonged to several immunological groups.

In the same districts a severe infectious enteritis may occur in calves. A vibrio obtained from these cases is culturally indistinguishable from that of infectious diarrhoea of the adult, but is more pathogenic for the calf.

II. The author discusses white scour of calves and describes experiments which have been carried out. Colostrum should be given early, but overfeeding should be avoided. Animals which are showing the first signs of the disease should be moderately purged with liquid paraffin and fasted.—D. R. Wilson.

Hoflund, S. (1933). Tarmstenos med multipla, falska pulsionsdivertiklar i tunntarm hos ko. **[Stenosis with Multiple Diverticulae in the Small Intestine of a Cow].**—*Skand. Vet.-tidskr.* **23.** 185-193. 3 figs. [3 refs.] [Summary in English : abst. from orig.]

A cicatricial stenosis of the small intestine of a cow is described. The lumen of the stricture was only large enough to pass an ordinary pencil. Immediately following this, lying almost symmetrically on each side of the mesenteric attachment, were numerous diverticulae, ranging from the size of a hazel nut to that of a walnut. These were formed by rupture of the muscular coat of the bowel between the blood vessels. The entrances to the diverticulae were about 1 to 1·5 cm. in diameter.—A. A. Forsyth.

Quin, A. H., Jr., & Shoeman, J. W. (1933). **Idiopathic Hemorrhagic Hepatitis of Swine.**—*J. Amer. Vet. Med. Ass.* **82.** 707-717. 4 figs., 1 table. [3 refs.]

Thirty-two pigs out of 130 died between July and September. The age of the animals at the commencement of the illness is not mentioned, but they averaged over 60 lb. in weight and were well-grown. Death followed an illness of two days duration without diarrhoea or respiratory symptoms, but with an irregular gait, depressed appearance and pendulous abdomen. *Post-mortem* examination showed hyperaemia and petechial haemorrhages of various glands and serous membranes, haemorrhagic inflammation of the gastric and duodenal mucosae, and a most outstanding enlargement and multi-colouration of the liver. The enlargement was due to interstitial oedema, and an amount of pink fluid exuded on pressure. Microscopic examination showed central necrosis of the lobules accompanied by haemorrhage, but although many white cells were present there were no eosinophiles. No protozoa were found, no organisms were cultivated, and the inoculation of healthy pigs with liver emulsion yielded no result.

The authors consider the condition to be a toxaemia ; from the discussion it seemed possible that it may be a protein poisoning connected with clover.

—Norman Hole.

Vink, H. H. (1933). Cirrhosis hepatis bij de huisdieren—een pathologisch-anatomisch onderzoek. [**Hepatic Cirrhosis in Domestic Animals. A Pathological and Anatomical Experiment**].—*Thesis for Veterinary Doctorate, Utrecht.* pp. 175. 14 figs. on 7 plates. [73 refs.]

The principal cases examined were those of hepatic cirrhosis in cats, dogs and cattle. In the cattle, difficulties were encountered due to liver distomatosis, which occurs frequently. In cats the disease is connected with increase in the size of the liver, the surface of which becomes irregular ; there is frequently an increase in the size of the spleen, and dropsy.

In dogs, dropsy occurred regularly and also a decrease in the size of the liver ; in cattle the author distinguished pericellular, peritrabecular and perilobular cirrhosis.—A. Klarenbeek (Utrecht).

Slagsvold, L. (1933). Kort oversigt over de almindeligste hudlidelser i vare sau- og gjetebesetninger—midler mot hudparasitter (" vask "). [**Review of the most Important Skin Diseases in our Sheep and Goats**].—*Norsk Vet.-tidsskr.* **45.** 280-307 and 321-328. 6 figs., 1 table.

In enumerating various parasitic disorders the author mentions, under forms of scabies in goats, a disease of the skin caused by *Demodex caprae* ; this seems to be of general occurrence and causes a good deal of damage, as the skins lose value.

Good results were obtained with experiments with the following antiparasitic washing preparations :– 2 to 2·5 per cent. solutions of liq. cresoli sapon. ; cresolum crudum + sapo kalinus ven., 1·5 to 2 per cent. of each ; creolinum (Pearson's) 2·5 to 3 per cent. The concentrations stated are said to be able to kill the ova of the *Hematopinus* and *Trichodectes* and the pupae of the *Melophagus ovinus*, so that a single wash should be sufficient to cleanse the animals.

—H. C. Bendixen (Copenhagen).

Stylianopoulos, M. (1933). Considérations sur la pleuropneumonie des chèvres en Grèce et contribution à son étude expérimentale. [**Pleuro-Pneumonia of Goats in Greece**].—*Rev. gén. Méd. vét.* **42.** 401-416. 3 tables. [8 refs.]

Pleuro-pneumonia of goats, at one time unknown in Greece, was first demonstrated by Passiokas in 1920. Its appearance coincided with the importation of

goats for meat from Asia Minor. Since then the country has never been able to rid itself of this deadly epizootic, not because the disease has become established as an enzootic, but because of the necessity for importing goats for slaughter and the impossibility of preventing the introduction of infection. It was only when the Government applied drastic regulations limiting the introduction of goats from Turkey, imposing quarantine periods and prohibiting the distribution of such animals throughout the country, that it was possible to combat the disease. The last appearance of the infection was in 1930 and it was then that the writer was able to make a systematic study of it. He states that the mortality varies in different outbreaks from 60 per cent. upwards, but oscillates around 98·5 per cent., the death rate varying with the season and being highest in winter.

It would appear that the infective agent is an obligatory parasite which cannot survive long in nature outside the animal body. It is localized in the infected lung and in the pleuritic exudate. It can be preserved for 15 days at laboratory temperature or in the ice-chest and in a 58 per cent. solution of glycerine. The existence of the virus in the blood during the course of the disease should be studied. Experimental transmission can be effected for several passages by pulmonary inoculation. The experimental incubation period varies from three to six days.

Attempts at vaccination, using pathological products untreated or modified by chemical means (formol), have given encouraging indications, but it is necessary to control these results by systematic research in the field where the disease presents itself as an enzootic. In the opinion of the writer the most certain and the least onerous method of dealing with the disease is by preventing its introduction into the country by rigorous sanitary measures and by dealing with the carriers of infection by isolation and slaughter without hesitation or concern.

—Ll. E. W. Bevan.

Sforza, M. (1933). L'influenza della fatica muscolare quale fattore acidogeno nella etiopatogenesi della pitirosi. **[Influence of Muscular Fatigue and Acidogenetic Factor on the Aetiopathogenesis of " Pitirosi "].**—*Profilassi.* **6.** 199-204. [Summaries in English and French : abst. from orig.]

The author discusses mineral balance. In a diet for horses the correct ratio between Ca and P is 1 : 1, or at most 1 : 3. This is not the case in a ration consisting largely of bran, in which there is an excess of phosphoric anhydride. In this case the excess of acid phosphates in the alimentary canal may give rise to digestive disturbances and chronic enteritis. Further, any excess of P absorbed will combine with the Ca ions of the tissues and lead to Ca deficiency. Since Ca ions play an important part in muscular contraction and nervous excitability, the condition becomes more severe in horses doing hard work. Overwork may play some part in the aetiology of the disease, aggravating the ill effects of an incorrect Ca and P ratio in the diet.—J. A. Nicholson.

I. Johnson, E. P., & Conner, Betty V. (1933). **Blood Studies of Fowls with Various Forms of Lymphomatosis (Fowl Paralysis).**—*J. Amer. Vet. Med. Ass.* **83.** 325-343. 6 figs., 19 tables. [12 refs.]

II. Furth, J. (1933). **Lymphomatosis, Myelomatosis and Endothelioma of Chickens caused by a Filterable Agent.**—*J. Exp. Med.* **58.** 253-275. 1 text fig., 9 figs. on 2 plates, 7 tables. [23 refs.]

I. The authors made a haematological study of 101 fowls comprising nine different breeds, affected with one or other of the symptoms loosely classed under the comprehensive term " fowl paralysis. "

Budding of lymphocytes was observed in 14 out of 31 fowls affected with

paralysis of the limbs in which no gross lesions were found on autopsy, and in 10 out of 14 paralysed fowls showing lymphatic hyperplasia of the visceral organs. In only 3 out of 15 paralysed fowls in which tumours were found on autopsy was budding of lymphocytes observed. Three out of 12 birds affected with iritis showed numerous budding lymphocytes.

It was observed in all the affected birds studied that the percentage of large mononuclears and mast cells was higher than in normal fowls, while the haemoglobin content was lower than normal.

Johnson and Conner conclude that, until more is known regarding the cause and method of transmission of the disease, partial control might be achieved by the use of total and differential blood counts in the early stages of the infection.

[The authors point out in their introduction that neither the cause nor the mode of transmission of lymphomatosis has yet been determined and this point must be emphasized in view of the claims made by different writers on insufficient data. Furthermore, the statements by different authors that the infection is transmitted through the egg and that certain breeds of fowls are more susceptible to the disease than others is based entirely upon weak circumstantial evidence and not upon sound experimental data. The suggestion put forward by the authors in this paper that the disease might in the early stages be detected by total or differential blood counts is hardly justified on the data given and no evidence is adduced to show that the blood changes observed are specific to lymphomatosis].

II. Furth [this *Bull.* **3.** 557.] describes a new transmissible strain of leucosis of fowls characterized by (a) lymphomatosis with or without tumour formation and with or without leucaemia ; (b) myelocytomatosis with or without leucaemia and (c) endothelioma. These diseases are transmitted by material free from viable cells and the evidence points to their being caused by a single filtrable virus.

[This important article does not lend itself to abstraction and the original should be consulted by those interested in the subject].—T. M. Doyle.

Rea, H. C. (1933). **Black Tongue [in Dogs].**—*J. Amer. Vet. Med. Ass.* **83.** 54-60. 1 table. [5 refs.]

A short historical introduction shows that this disease is of obscure origin and at various times has been associated with " typhus " and " Stuttgart disease " in dogs, but this paper gives a differential diagnosis. It is a disease of dogs in the course of which severe symptoms of a gastro-intestinal inflammation are observed, frequently complicated by ulcerative stomatitis and severe nervous symptoms. Age, sex and breed appear to have no noticeable influence upon susceptibility. It is classed as a nutritional deficiency disease—all experimental attempts at artificial transmission having failed and all efforts to make cultures from heart blood being negative. [It has been suggested that it is due to vitamin B_2 deficiency]. Blood and urine analysis of samples obtained from 17 cases showed an increase in non-protein-nitrogen, urea nitrogen, uric acid, carbon dioxide combining power, and a fall in the chloride content of the blood whilst the urine was high in nitrogen and low in chlorides and contained albumin and casts. Treatment carried out in 255 cases with brewers' yeast, sodium chloride and glucose, lime-water and calcium gluconate, carotene extracts and glycerine, liver extract alone, and liver extract and sodium chloride showed that the best results were obtained with sodium chloride and that feeding raw beef muscle and canned salmon was most beneficial.

—James Stewart.

Hart, G. H., Mead, S. W., & Guilbert, H. R. (1933). **Vitamin A Deficiency in Cattle Under Natural Conditions.**—*Proc. Soc. Exp. Biol. & Med. New York.* **30.** 1230-1233. [1 ref.]

On Californian ranges during the dry season conditions are favourable for the development of vitamin A deficiency in livestock, but under average conditions the cattle will carry sufficient reserves. In 1932 there was a prolonged dry period and vitamin A deficiency was definitely proved [method of Carr & Price (1926). *Biochem. J.* **20.** 497.] to be the cause of the deaths of 100 animals on one ranch. The feed consisted of the unharvested grain, natural pasture, stubble following wheat and barley, straw, wheat and barley hay, barley, whole cotton seed and a proprietary concentrate. Deficiency manifestations were most marked in young stock. Night blindness was the most prominent symptom with, in some cases, ophthalmia and ulceration of the cornea ; milk, cream and butter lacked colour. Calves born early became unthrifty and showed definite symptoms when about three months old. Calves which were born later were weak, had severe diarrhoea, and died when one to five days old. Oestrum in cows was delayed until green food was available. In steers there was profuse lachrymation, ulceration of cornea, shrinking of the eyeball and permanent blindness. Liver samples gave negative results when tested for the presence of vitamin A with antimony trichloride. The animals which survived recovered with the advent of green food.—R. G. Linton.

I. Theiler, A. (1933). Die Bedeutung des Kalziums und des Phosphors im Haushalte der Wiederkäuer. [**The Significance of Calcium and Phosphorus for Domesticated Ruminants**].—*Schweiz. Landwtschl. Mschr.* **11.** 29-51 and 73-79. 7 figs., 10 tables. [47 refs.]

II. Theiler, A. (1933). Das Phosphordefizit und die Unfruchtbarkeit des Rindes. [**Phosphorus Deficiency and Sterility of Cattle**].—*Schweiz. Arch. Tierhlk.* **75.** 47-66. 3 tables. [28 refs.]

III. Theiler, A. (1933). Untersuchungen über den Bau normaler und durch Kalzium- und phosphorarme Nahrung veränderter Rinderknochen. [**Investigations into the Structure of Cattle Bone, Normal and Altered by Feeding upon Rations Low in Calcium and Phosphorus**].—*Ibid.* 339-366. 10 figs.

I. The main subject matter of this article has already been abstracted from various separate papers [this *Bull.* **1.** 313, **2.** 101, 168 and 391, and **3.** 39.] but the presentation is designed for the particular journal in which it appears and contains fresh review material [e.g. the work of Fitch, Boyd, Eckles, Gullickson, Palmer & Kennedy—this *Bull.* **2.** 613,—of Sjollema—this *Bull.* **3.** 201, and others]. It is written particularly for the Swiss agriculturalist and veterinarian and should serve to drive home the view-point of the author, now well-known in British and Dominion circles.

II. This paper suggests that it would be to the interest of the animal industry of Switzerland to pay more attention to the possible role of phosphorus deficiency as cause of sterility in cows. Evidence is assembled from various parts of the world to show the correlation between aphosphorosis and protective cessation of oestrum, and the discussion of bibliography is instructive.

In both papers the author considers the mineral requirements of the animal in relation to the caloric equivalent or " starch value " of the rations fed.

III. A modified version of the longer article with the same title [this *Bull.* **3.** 39].—H. H. Green.

Parkhurst, R. T., & McMurray, Mary R. (1933). **Factors in the Development of Deforming Leg Weakness in Chickens.**—*J. Agric. Sci.* **23.** 311-327. 1 fig. on 1 plate, **23** tables. [12 refs.]

The intensive rearing of chickens in confinement, particularly when wire floors or batteries are used, is usually marked by the development of a form of leg

weakness known as " perosis." This deformity includes leg curvature, enlarged hocks, slipped tendons and crooked toes, but excludes leg weakness due to rickets or paralysis. It occurs in chickens between three and six weeks old.

The authors' investigations revealed the cause to be an excessive amount of meat and bone meal in the ration as it rarely occurred when the bone meal content was low or nil. It was also found that bone deformities were intensified in battery brooders when the mineral balance was unsatisfactory. Wire floors probably contributed to the occurrence of crooked toes.—Gwilym O. Davies.

PUBLIC HEALTH.

Tweed, W. (1933). **Latest Developments in the Slaughter and Inspection of Animals for Food.**—*Vet. Rec.* **13.** 804-806.

The author deals with the well-worn subject of registered and licensed *versus* public abattoirs. The registered type can only be got rid of by compensation. From a supervision point of view and a good system of meat inspection, public abattoirs are the ideal to be aimed at. These cannot be adopted in scattered areas, but more concentrated killing, as recommended by the Departmental Committee on Meat Inspection (1921), could be arranged. The latest methods of slaughter are dealt with ; these consist of the captive bolt and the electrical types which, due to the new Slaughter Act (1933), will come more and more into use. The prices were rather high, but much cheaper instruments have lately been placed on the market. The employment of whole-time county veterinary inspectors with meat inspection added to their present duties appears to be the best means of improving the present unsatisfactory inspection methods existing in many rural districts.—T. Dunlop Young.

I. Wooldridge, W. R. (1933). **Meat Preservation.**—*Vet. Rec.* **13.** 1112-1126. [14 refs.]

II. Young, T. Dunlop. (1933). **Congress Consideration of Meat Preservation.** —*Ibid.* 1127-1128.

I. After a short account and discussion of the *post-mortem* changes occurring in meat, and how these conditions may be affected by methods of storage, various processes for meat preservation are mentioned. These include refrigeration, canning, salting and smoking, all of which are briefly dealt with. " Bone taint " may be avoided by the rapid cooling of carcasses immediately after dressing, the old method of hanging carcasses to extract the animal heat before cooling having been proved useless.

II. Further support is given to the contention that the rapid cooling of carcasses prevents " bone taint," and the inutility of the hanging period for the extraction of animal heat is emphasized.—D. J. Anthony.

I. Piettre, M. (1933). A propos de l'emploi d'acide benzoique pour les produits d'enrobage destinés à la protection de denreés alimentaires d'origine carnée. [**The Use of Benzoic Acid in Coatings intended to protect Meat Products**].—*Ann. d'Hyg. publ. Indust. et Soc.* **10.** 134-137.

II. Bordas, F. (1933). Enrobage des produits de la charcuterie. [**Protective Coatings of Meat Products**].—*Ibid.* 282-285. [6 refs.]

I. A gelatine coating impregnated with benzoic acid (0·485 g. per litre) has been used as a coating for certain meat products. Sausages coated with the usual gut casing or cellophane were covered with this gelatine. There was no penetration

of the benzoic acid into the sausage meat whereas, when the meat was brought into direct contact with the gelatine, penetration of the acid occurred throughout its substance. Clean sausages are dipped in a bath of the prepared benzoated gelatine, allowed to drain, and are dried to the required degree. A glistening pleasing coating results, which successfully preserves the meat from deterioration.

II. Experiments on " cristella " (benzoated gelatine) indicate that if the meat products so covered (e.g. sausages) are dry, there is no penetration of benzoic acid into the meat, but if the meat products are more or less rich in water, penetration of the acid does occur. In view of the difficulty in determining the degree of dryness required to prevent such penetration etc., the French authorities have decided not to permit the use of this gelatine coating for meat products. [In Great Britain the only preservative allowed under the Public Health (Preservatives in Food, etc.) Regulations, 1925, for sausage meat, etc., is sulphur dioxide in a proportion not exceeding 450 parts to a million].—D. J. Anthony.

Neveu, R. (1933). L'industrie du froid en France. [**The Refrigerating Industry in France**].—*Ann. Hyg. Paris.* **11.** 301. [13 refs.]

This consists of a brief survey of the refrigerating industry from the early work of Tellier (1868) to the use of artificial snow (CO_2) of the present day. Although this industry is built upon French discoveries, its expansion has been greater in foreign countries. It is recommended that greater use be made of refrigeration for the preservation of meat, fish, fruit and other foods, in place of chemical preservatives. In dealing with meat, emphasis is laid upon the necessity for slow thawing of the frozen product. [No mention is made of Carré's work (1861)].—D. J. Anthony.

Haines, R. B. (1933). **Observations on the Bacterial Flora of some Slaughter-houses.**—*J. Hyg. Cambridge.* **33.** 165-174. 3 figs., 4 tables. [2 refs.]

Haines, R. B. (1933). **The Bacterial Flora Developing on Stored Lean Meat, especially with regard to " Slimy " Meat.**—*Ibid.* 175-182. 1 fig., 5 tables. [7 refs.]

A preliminary survey of the bacterial flora of the air of two different types of abattoir indicates that the contamination with bacteria is lower in the modern type with smooth concrete floors, tiled walls and ducts and drains to carry away offal and dung. Such an abattoir is frequently washed down with a hose-pipe and the hot water for wiping the carcasses is often changed. Cleaner working conditions generally lead to the diminution of bacteria in the air, and in the water used for wiping the carcasses. The bacteria isolated consisted of cocci and both soil and intestinal bacilli, the latter tending to be more prevalent where working conditions were not so clean.

The second paper records the predominance of Gram-negative bacteria belonging to the *Achromobacter* group in the slime developing in lean meat which had been stored at a temperature slightly above 0°C. Data regarding the characteristics of the strains and the rate of growth at varying temperatures are given. The important point in the investigation showed that slime becomes noticeable in meat when the bacterial count thereof is approximately $10^{7 \cdot 5}$ organisms per sq. cm. It therefore follows that the lower the initial bacterial count the longer the time before " slime " appears. Therefore, every care should be taken to lower the bacterial contamination of meat during killing and dressing.—R. Lovell.

Henneberg, O. H. (1933). Ueber die Verhütung von Fleischvergiftungen beim Menschen. [**Prevention of Meat Poisoning in Human Beings**].—*Wien. klin. Wschr.* **46.** 178-180.

The author recognizes that actual infection of the animal used for food may constitute only a proportion of the sources of meat poisoning in human beings due to paratyphoid bacteria. Nevertheless, in attempting to deal with its prevention, he divides the domesticated animals into three groups. The first includes those which may suffer from primary paratyphoid infection and such diseases as calf diarrhoea, abortion in mares and sheep, paratyphoid in pigs, pullorum disease and fowl typhoid are mentioned. With the exception of calf diarrhoea, these infections do not seem to be dangerous to human beings. [It would be interesting to determine the types of *Bact. suipestifer* concerned with pig paratyphoid (ferkel-typhus). The Glässer and Voldagsen types are probably not pathogenic for human beings whereas the other types of *Bact. suipestifer* are]. The second group consists of animals with a more or less non-specific enteritis in which members of the paratyphoid group of bacteria may be present, whereas the third group are those in which paratyphoid bacteria act as secondary invaders. In these cases bacteriological examination is necessary to determine their presence, although the author assumes the presence of such bacteria in the intestine of normal animals. [There is a difference of opinion as to the presence of such bacteria in the intestines of normal animals].—R. Lovell.

McBurney, R. (1933). **Food Poisoning due to Staphylococci. Report of an Outbreak.**—*J. Amer. Med. Ass.* **100.** 1999-2001. 1 table. [9 refs.]

Outbreaks of food poisoning due to staphylococci in which the vehicle has been milk, cake, cheese and chicken gravy have been reported in America. A further outbreak in which chocolate éclairs were involved is here recorded. The cause was a golden-yellow staphylococcus and proof was occasioned by epidemiological features and by the feeding of broth filtrates of the organism to human volunteers.

The source of the contamination of the food was not traced, but suggestions for the sanitary handling of such foodstuffs are made. [In previous outbreaks, cows' milk has been cited as a possible source].—R. Lovell.

Gloyne, S. R. (1932). **The Presence of the Tubercle Bacillus in Milk.**—*Tubercle.* **13.** 443-450 and 488-497. 21 tables. [21 refs.]

The following aspects of the subject are considered :—

(a) The technique of milk examination, including the microscopic method, animal inoculation tests and direct cultural examination.

(b) The records of the routine examination of milk samples from the County of Essex. Out of a total of 1,560 samples examined biologically, 128 (8·2 per cent.) were positive, 147 gave inconclusive results (only one guinea pig used) and 1,285 were negative.

(c) The examination of special classes of milk. Of 30 samples of condensed milk, one was found to contain acid-fast bacilli microscopically, but was negative to the guinea pig test. A further 30 samples were negative to the biological test. 52 Grade A (tuberculin tested) milk samples yielded two positive and 49 Grade A (non-tuberculin tested) five positive inoculation results. 28 tests to determine whether the milk churn could be a source of contamination with tubercle bacilli failed to substantiate the theory.

(d) Attempts were made to cultivate the organism by direct culture on different media. Of 300 tests, seven gave positive cultures as compared with 25 positive guinea pig results, but only in five cases did the results agree as in two instances cultures were positive and the guinea pigs negative.

(e) The author also records that two milk samples were encountered in which the tubercle bacilli appeared to be of abnormally low virulence for guinea pigs. —Gwilym O. Davies.

THERAPEUTICS.

I. Erhardt, A. (1933). Testierungsmethode dreiwertiger Antimonpräparate an der Opisthorchiasis der Katze. [**A Method of Testing Trivalent Antimony Preparations on Opisthorchiasis in the Cat**].—*Arch. Schiffs- u. Trop.-Hyg.* **37.** 131-135. 3 tables. [6 refs.]

II. Erhardt, A., & Brumpt, L. (1933). Wirkung der Brenzkatechindisulfosäure und ihrer Komplexverbindungen auf Opisthorchis felineus (Riv.) in vitro und in vivo. [**The Action of Catechol Sodium Disulphonate and its Compounds on** *Opisthorchis felineus* **(Riv.)** *in vitro* **and** *in vivo*].—*Ibid.* 182-190. 1 table, 2 graphs. [7 refs.]

I. Erhardt describes an improved method for concentrating and enumerating the eggs of opisthorchis in the faeces of cats. The infestation in some individual cats does not respond to antimony, thereby rendering them unsuitable as subjects on which to test trivalent preparations of antimony for use in man. Catechol sodium disulphonate has proved, however, to be a useful test substance, injections of 0·4 g. per kg. body weight resulting in an increased dissemination of eggs by the parasitic worms in instances where the infestation will respond to antimony treatment.

II. It was found that *Opisthorchis felineus* could be kept alive for 14 days in Ringer's solution at 37°C. and worms kept in this way were used for tests on the specific anthelmintic properties of salts of antimony and compounds of catechol sodium disulphonate with heavy metals. Although active *in vivo*, these substances do not appear to act *in vitro* ; catechol sodium disulphonate is almost as harmless as sodium chloride yet acts upon *Opisthorchis*, *in vivo*, and the authors postulate the metabolic production in the liver of the host of some substance which is very toxic to the worms.—E. L. Taylor.

Guiseppe, C. N., & Sicilia, G. (1933). La cura Bacelli nel tetano. [**Bacelli's Treatment of Tetanus**].—*Profilassi.* **6.** 243-254. [Summaries in English and French : abst. from orig.]

Cases of tetanus in horses, donkeys and mules are described. For various reasons recourse to serum therapy was not possible and Bacelli's treatment was given. This consists in injecting subcutaneously 10 per cent. carbolic acid in glycerine. The dosage varied, but 10 c.c. five times per day gave good results. The treatment was continued for periods up to 20 days and complete recovery was obtained in the majority of the cases.—J. A. Nicholson.

I. Coles, J. D. W. A. (1932). **Sour Milk in Avian Coccidiosis.**—*J. S. Afric. Vet. Med. Ass.* **3.** 198-199.

II. Andrews, J. (1933). **The Control of Poultry Coccidiosis by the Chemical Treatment of Litter.**—*Amer. J. Hyg.* **17.** 466-490. 1 fig., 1 plate, 3 tables, 3 graphs. [16 refs.]

I. The treatment recommended by Coles for acute coccidiosis is the substitution of sour milk for the whole of the ration for the first four days of an outbreak, replacing this in gradual stages over one month by the ordinary ration.

II. This paper contains an account of experiments designed to ascertain

the value of spraying poultry house litter with 10 per cent. tar acids in mineral oil for the prevention of coccidiosis. Spraying was not found to be more effective than frequent cleaning out, and where the sprayed pens were left uncleaned for long periods the disease eventually appeared. [The explanation suggested by the author is that, in uncleaned pens, the oocysts are protected by organic matter, but the impression gained from a study of the results is that the treatment destroyed or inactivated a sufficiently high percentage of oocysts to obviate massive reinfection]. —R. S. Roberts.

Cremona, P., & Monaco, R. (1933). Sulla bronchite verminosa dei bufali. [**Verminous Bronchitis in the Buffalo**].—*Profilassi.* **6.** 141-142. [2 refs.] [Summary in French : abst. from orig.]

In an outbreak of verminous bronchitis due to *Dictyocaulus viviparus*, three buffaloes and seven cows were affected. Two of the cows died before treatment was begun, but the remaining animals recovered. These received on alternative days five intratracheal injections, each consisting of 10 c.c. of 2 per cent. picric acid.—J. A. Nicholson.

Hupka, E., & Meier, K. (1933). Die Therapie der Gebärparese mit Calcium. [**Calcium Therapy in Milk Fever**].—*Deuts. tierärztl. Wschr.* **41.** 33-37. [5 refs.]

This paper records results of calcium treatment on 84 cases of milk fever and 7 cases of acetonaemia—4 with calcium chloride, 17 with calcium glycerophosphate, 8 with calcium gluconate and 62 with Sjollema's mixture of calcium and magnesium chlorides [this *Bull.* **3.** 53]. In 60 per cent. of the cases injection was intrajugular and in 40 per cent. into the mammary vein. Swellings at the site of injection caused no serious complications.

The authors report favourably on calcium therapy for milk fever and prefer it to udder inflation, as avoiding interference with milk secretion. Relapses were avoided by a second injection subcutaneously. In cases of acetonaemia, calcium injections should, however, be avoided or only used in small doses at the beginning. —H. H. Green.

Holmdahl, G. (1933). Intravenaösa injektioner av bikarbonatlösning (enl. Hallenborg) vid acetonämi hos kor—goda resultat. Kasuistik. [**Good Results with Bicarbonate Injections against Acetonaemia in the Cow**].—*Svensk Vet.-tidskr.* **38.** 176-180.

The author gives 11 case records of acetonaemia in cows in milk treated with 12 per cent. aqueous sodium bicarbonate given intravenously. The dose was 80 g. of the dry salt in most cases and recovery was rapid.—J. E.

Stalfors, H. (1933). Några ord om behandlingen av upphörd mjölksekretion (agalactia) hos suggan i samband med förlossningen. [**Treatment of Agalactia in Sows at the Puerperium**].—*Svensk Vet.-tidskr.* **38.** 240-243.

Inadequacy of milk production in sows has been successfully treated in Denmark and Sweden by the intravenous injection of pituitrin. Doses of 0·25 to 2 c.c. are injected into an ear vein, followed by three uterine douches at two-hour intervals. The dose of pituitrin is repeated next day if necessary. Recovery is usually uneventful and rapid.—A. A. Forsyth.

—. (1933). **Discussion on the Use of Iodine Compounds in the Treatment of Thyroid Disease.**—*Proc. Roy. Soc. Med. London.* **26.** 870-880. [20 refs.]

Professor C. R. HARINGTON gave a history of the use of iodine in thyroid disease since the 13th century. He is inclined to the view of KOCHER, that Grave's disease is a " thyroid diarrhoea," rather than a dysthyroidism. As a palliative, iodine is of importance as it produces involution of the existing hyperplasia. This creates a pressure retention of the active principle. It is suggested that it would be better to administer diiodotyrosine which would hasten the involution by shortening the journey from iodine to thyroxine.

Dr. H. GARDINER-HILL expressed the opinion that iodine is of use in diffuse simple goitres but not in the nodular type. In primary Grave's disease iodine gives beneficial results for a time and then becomes ineffective. Medical treatment is not comparable to surgical and operation should follow shortly after medication begins. Iodine is of doubtful value in secondary Grave's disease.

Mr. T. P. DUNHILL said that prolonged iodine treatment tended to increase the danger of surgical interference.—HENRY DRYERRE.

POISONS AND POISONING.

I. MINETT, F. C., WOOLDRIDGE, G. H., & SHEATHER, A. L. (1934). **An Experimental Enquiry concerning so-called Sewage Poisoning in Cattle.**—*Vet. Rec.* **14.** 147-155. 6 figs., 3 tables, 1 chart. [14 refs.]

II. PUGH, L. P. (1934). **Sewage : Is it a Source of Poisoning in Animals ? I. From the Clinical Aspect.**—*Ibid.* 155-156.

III. STABLEFORTH, A. W. (1934). **Sewage : Is it a Source of Poisoning in Animals ? II. From the Bacteriological Aspect.**—*Ibid.* 156-159.

IV. LANDER, G. D. (1934). **Sewage : Is it a Source of Poisoning in Animals ? III. From the Chemical Aspect.**—*Ibid.* 159-161. [Discussion pp. 161-166].

I. The enquiry was undertaken in connection with an action at law to determine whether water containing human sewage has any harmful effect upon cattle, as has been alleged. For the purpose, three healthy Ayrshire cattle, viz., a cow in milk, a dry cow and a yearling, were allowed to consume during a period of 21 months water containing sewage. The milking cow consumed in all 5,146 gallons of sewage and for nearly a year drank nothing but undiluted effluent. The two other animals consumed 916 and 767 gallons of sewage respectively ; this included 579 and 477 gallons respectively of effluent diluted with water and 337 and 290 gallons respectively of sewage before final purification. There was no indication that the animals found the fluid distasteful ; they thrived normally and maintained or increased their weight ; the milking cow gave birth to a healthy living calf and her milk yield reached 731 gallons in the subsequent lactation.

This experiment, taken in conjunction with the relevant literature which is reviewed in the article, gave no support to the belief that there is such a condition as sewage poisoning. Symptoms shown by cattle alleged to be poisoned by sewage must, therefore, be due to other causes.

II. From clinical observation, Pugh concluded that under natural conditions cattle might suffer from sewage poisoning. Objection was raised to the experiment referred to above on two grounds, first, that the effluent fed was more highly purified than that which was considered to have caused damage in the action, and, secondly, because the experimental animals were under artificial conditions. [In the experiment, however, the milking cow consumed 4,170 gallons of this possibly more highly purified effluent in an undiluted form, and the two other animals for over a year drank water containing sewage before its final purification. Also, the

experiment had to be conducted under conditions which would exclude complicating influences].

III. Stableforth, viewing the matter from the bacteriological aspect, concluded that no specific bacterium could be incriminated. Attention was drawn to the fact that on sewage farms cattle are fed on material contaminated with crude sewage with no ill effect.

IV. Lander discussed the possible toxicological significance of substances which can be identified in an analysis of human sewage. It was impossible to suppose that the addition of such substances in minute doses to the mass of ingesta in the herbivorous tract could be poisonous or predispose to injury, especially when it is remembered that the changes undergone by food in the bovine are similar in general to those which take place in the alimentary tract of man.

—F. C. Minett.

Richters. (1933). Veterinärdienst im Luftschutz. Hilfeleistung bei Gaserkrankungen der Tiere. [**Veterinary Services in Case of Poison Gas Injuries in Animals**].—*Tierärztl. Rdsch.* **39.** 523-524. 2 tables.

Richters. (1933). Giftgasgefahren für Tiere und Lebensmittel und ihre Abwehr. [**Danger of Poison Gas to Animals and Foodstuffs**].—*Ibid.* 589-593.

Richters. (1933). Veterinärdienst im Luftschutz. Die Entgiftung der Tiere, Gegenstände, Ställe und Raüme, sowie des Geländes nach Luftangriffen mit Kampfstoffen. [**Protection of Animals against Poison Gas. Antidotes and General Management**].—*Ibid.* 739-743. 4 figs. [3 refs.]

These papers comprise a résumé of knowledge as to the nature, effects on animals, remedial and preventive measures, and the detoxication of animals, buildings, equipment and land after gas attack. They are based on the same author's work on " Animals in Chemical Warfare " [this *Bull.* **3.** 456.], are of the nature of broadcast information to veterinarians, agriculturists and animal owners in general, and appear to be part of a general educative propaganda on defensive measures against air attack.

The best first aid method is removal from the site, fresh air, rest, and protection against exposure. As regards true gases, such as chlorine and phosgene, diffusion and air currents lead more or less rapidly to their dissipation. Most of the so-called gases are in fact liquids of fairly high boiling point, are atomized by the bomb explosion, and are unstable and rapidly decomposed by water or on moist earth. The most relatively stable appears to be mustard-gas (chlorethylsulphide) which, however, does not survive much longer than two days on moist earth. The best detoxicants are fresh bleaching powder or other hypochlorites.

Certain arsenical compounds, such as Blue Cross or Clark I (diphenylarsine chloride) may leave arsenical residues, which are not likely in point of concentration to constitute a serious potential hazard.—G. D. Lander.

I. Kick, C. H., Bethke, R. M., & Edgington, B. H. (1933). **Effect of Fluorine on the Nutrition of Swine, with Special Reference to Bone and Tooth Composition.**—*J. Agric. Res.* **46.** 1023-1037. 4 figs., 1 plate, 11 tables. [41 refs.]

II. McClure, F. J. (1933). **A Review of Fluorine and its Physiological Effects.**—*Physiol. Rev.* **13.** 277-300. [127 refs.]

I. Eight lots of growing pigs were used in the experiment, six lots receiving varying amounts of either sodium fluoride or rock phosphate in their ration, the other two being controls. The percentage of fluorine varied between 0·029 and 0·097 of the ration.

The results showed that fluorine causes impaired growth and thickening of the bones, including the mandibles, with softening of the teeth. Rock phosphate, but not sodium fluoride, also caused indurative nephritis.

The article contains several tables of the mineral analysis of rations, bones and teeth and a review of literature from human and animal pathology.

II. A systematic review of the literature on fluorine under the following headings :—distribution in nature (soils, waters, plants, animal tissues), significance of its occurrence in animal organs and physiological (toxic) effects on animals with reference to dietetics, and diseases. [VELU's work on darmous in Morocco—this *Bull.* **2.** 509—has been overlooked].—J. E.

REINHARDT, R. (1933). Fütterungs- und toxikologische Versuche mit gebeizten Saatgetreide. [**Feeding and Toxicological Experiments with Pickled Grain**]. —*Zschr. Infektkr. Haust.* **44.** 309-324. [18 refs.]

The effect on fowls has been investigated of grain pickled with various mercurial preparations, sold under trade names and consisting of mercury in organic combination (e.g. with chlorphenol) together with, in one case, a preparation containing copper and arsenic.

In the strength used in practice the quantity of mercurial in 100 g. corn ranges from 0·032 g. to 0·2 g. and it is shown that no ill effects on health or egg-laying capacity ensue from daily feeds of up to 155 g. of the dressed grain.

The poisonous doses of the pure mercurial preparations range from 1 g. to 1·6 g. per kg. body weight.—G. D. LANDER.

PHYSIOLOGY.

KRZYWANEK, F. W. (1933). Die Physiologie des Wiederkauens. [**The Physiology of Rumination**].—*Tierärztl. Rdsch.* **39.** 457-462. [20 refs.]

Krzywanek in his inaugural lecture as Professor of Physiology at Berlin Veterinary College describes the great advance in the knowledge of the mechanism of rumination which has taken place in the last few years.

The problem is discussed with particular attention to (1) the destination of freshly ingested food ; (2) the mechanism of regurgitation ; (3) the passage of ingesta into the abomasum and (4) the behaviour of swallowed fluids.

With regard to movements of the stomach, it is now known that the rumen has a general peristaltic action as well as the power of multiple local contractions. The reticulum makes a double contraction, the first part being weak and the second very strong, which is followed immediately by the ruminal movement. Nothing certain is known about the movements of the omasum. Food after being swallowed is energetically cast about between reticulum and rumen.

Theories on the mechanism of regurgitation have been numerous. It is now held that in 1875 CHAUVEAUX was correct with his theory that the withdrawal of food up the oesophagus is an act of suction and not one of expression by the stomach. Lately WESTER and STIGLER made much progress in the problem and confirmed the suction theory.

Ruminants with even unilateral pneumothorax are unable to regurgitate and those with a tracheal opening have difficulty in doing so. To regurgitate, an inspiration is made, causing a negative intrathoracic pressure, the glottis is closed, the cardia opens and a long column of ingesta is sucked up the oesophagus : the second part of the act is caused by expiration combined with antiperistalsis of the oesophagus and closure of the cardia, and the food is carried to the

mouth. Contraction of the abdominal muscles aids the second phase but is not essential for it.

As regards the destination of food swallowed after rumination, we now know that in adult cattle it goes back whence it came—into the reticulum and rumen. The oesophageal groove loses its power to close up after weaning and therefore only acts as a short cut to the omasum in calves. The factors influencing the passage of food into the omasum are the fineness in consistence and fluidity of the food itself.

The author recently made a valuable contribution to the knowledge of the destination of fluids swallowed. WESTER discovered the oesophageal groove reflex of calves, but experiments with solutions of dyes, etc., on adult cattle gave conflicting results. Krzywanek attacked the problem by thermometric means : he inserted temperature recording instruments through a ruminal fistula into the gastric cardiac region of goats and sheep and was thus able to learn where cold ingested fluid went [this *Bull.* **3.** 49]. It appeared that the destination was due to the existing fluidity of the contents of the forestomachs, the more fluid, the more rapid the passage to the abomasum. In addition, working on the assumption that sugar is not absorbed from the rumen, the author gave sugar solution to sheep and tested the blood for sugar increase, an increase being assumed to indicate absorbtion from the abomasum. [This assumption has been proved untenable by TRAUTMANN—this *Bull.* **3.** 572.—who showed that absorbtion can take place from the rumen].

Discussing the supposed necessity of rumination for life which holds good for adult cattle, the author refers to an experiment of TRAUTMANN who, after removing the reticulum from a yearling goat, was able to keep it alive for one year, during which it never ruminated. TRAUTMANN also observed regeneration of parts of the forestomach which had been surgically removed.—J. E.

I. MÜLLER, O. (1933). Ueber die O_2—Kapazität des Blutes gesunder und kranker Pferde und Rinder nebst Berücksichtigung weiterer Blutkonstanten. [**Oxygen Capacity of the Blood of Healthy and Diseased Horses and Cattle**].—*Inaug. Diss. Zurich.* pp. 55. 1 plate, 2 tables, 10 graphs. [55 refs.]

II. MEYER, A. (1933). Ueber die Wasserstoffionenkonzentration im Blute gesunder und kranker Pferde. [**pH of the Blood of Healthy and Diseased Horses**].—*Arch. wiss. prakt. Tierhlk.* **66.** 512-520. [11 refs.]

I. Oxygen capacity, haemoglobin, methaemoglobin and specific gravity estimations, as well as erythrocyte and leucocyte counts, were carried out on the blood of 24 horses and 41 cattle. The values of these constituents in animals suffering from the pathological conditions due to tuberculosis, paratuberculosis, foreign body abscess, nephritis, tetanus and various anaemias are discussed. It is suggested that the leucocyte count is a valuable aid to the clinical diagnosis of several diseases. The author found the chemical method of CONANT more useful than the colorimetric method of STADIE in the estimation of methaemoglobin.

II. The pH of the blood of healthy horses, estimated electrometrically, was found to be 7·46 pH with the small range of 7·38 to 7·54 pH. Little variation from this normal was found in horses suffering from either chronic or acute diseases of the intestines, heart and lungs. [In both papers the number of cases examined of any one disease is too small to warrant any definite conclusions].

—JAMES STEWART.

I. PEITZER, G. (1933). Untersuchungen über die durch die funktionelle Beanspruchung während der Trächtigkeit hervorgerufenen histologischen

Veränderunger der Arteria uterina media des Rindes. [**Investigations into the Histological Changes in the Middle Uterine Artery of Cattle Produced by the Functional Requirements of Pregnancy**].—*Arch. wiss. prakt. Tierhlk.* **66.** 234-253. 3 figs., 3 tables. [17 refs.]

II. Schacht, G. (1933). Untersuchungen über die durch die funktionelle Beanspruchung während der Trächtigkeiten hervorgerufenen, histologischen Veränderungen der Arteria spermatica interna und ihrer beiden Aeste sowie der Arteria uterina caudalis des Rindes. [**Investigations into the Histological Changes in the Internal Spermatic Artery and both its Branches and also in the Posterior Uterine Artery of Cattle produced by the Functional Requirements of Pregnancy**].—*Ibid.* 254-269. 4 figs., 2 tables. [1 ref.]

III. Müller, E. (1933). Schwangerschaftsveränderungen an Uterus des Rindes. [**Pregnancy Changes in the Uterus of the Cow**].—*Inaug. Diss. Leipzig.* pp. 51. [17 refs.]

I. The author of this paper has examined histologically strips taken from the middle uterine artery of cattle. The age, number of parturitions and month of pregnancy were known in the 21 cows used for these experiments. The technique adopted was to remove strips 2 cm. long from three positions of the artery in question and, after suitable staining, to examine serial sections. Differences were observed between the structure of the arterial wall in young and in older animals. These were mainly distinguished by an alteration in the elastic tissues of the artery. In young animals the internal elastic tunic usually forms a single membrane which is covered with endothelium ; in older animals this membrane is more or less collected into bundles of elastic fibres. During pregnancy changes were also noted in the middle coat of the artery. This appeared to become looser in construction, due to the appearance of longitudinal muscular bundles. It was thought that the uterine activity, usually observable clinically from the third month of pregnancy, might be accompanied by marked histological changes in the arterial wall ; this, however, is not the case and the onset of uterine activity is not revealed solely by histological examination of this artery.

II. The technique adopted in the previous paper was again followed in this work which was extended to other associated arteries. It was found that in both branches of the posterior uterine artery a loosening of the middle coat sets in at about the fourth month of pregnancy. This effect becomes more marked as pregnancy advances, until the entire middle coat is involved. Again, changes in the distribution of the elastic tissue of the arterial wall and an increase in connective tissue were observed. These changes also took place, but to a less extent, in the anterior uterine and internal spermatic arteries ; they were seldom seen in the branches supplying the uterus and never in those branches supplying the vagina. Since these changes do not occur in all other neighbouring arteries they cannot be produced by the age factor. They can, however, be regarded as a regenerative process since the intima growth and the increase of the internal elastic layer is very similar to that seen in the healing of the damaged vessels. The author considers that the marked stretching of the vessels from the weight of the gravid uterus might be sufficient to cause the changes seen in the arterial walls. Whether the increased blood supply required in this region during pregnancy is in any way responsible for these effects appears doubtful. On the evidence obtained it may be said that the functional claim placed on a single genital artery during the course of pregnancy is clearly reflected in the histological appearance of the arterial wall.

III. In this work an account is given of the structure of uteri obtained from 25 cows after slaughter. The technique adopted was to remove sections for measurement and histological examination from the body and pregnant and non-

pregnant horns of each uterus. In the resting stage the uterine wall in each of these three positions is of uniform thickness ; during pregnancy, however, there is a marked thinning of the wall of the gravid horn, presumably due to the distention caused by the growth of the foetus. Also, but to a less extent, the body and non-gravid horn of the uterus show thinning of their walls during pregnancy. In the resting stage, the mucosa accounts for almost two-thirds of the thickness of the walls, but as pregnancy advances the proportion of muscle tissue increases, the muscle bundles reaching their maximum development by the fourth month. Hyperplasia of the muscle cells themselves was never observed. In the resting uterus many histiocytes and fibroblasts are present ; these develop with the growth of the uterus into connective tissue cells. The collagen connective tissue is an important constituent of the resting uterine wall, appearing as a homogenous mass. During pregnancy there is an oedematous infiltration of the uterine walls, which is very pronounced in the pregnant horn. No variation in the epithelium was ever observed.—J. A. Nicholson.

Papi, A. (1933). Di un nuovo metodo di diagnosi sperimentale della gravidanza nella vacca. [**A New Method for the Experimental Diagnosis of Pregnancy in the Cow**].—*Profilassi.* **6.** 40-44. 2 tables. [Summary in French : abst. from orig.]

The author of this paper obtained urine from a heifer and from two pregnant cows. 10 c.c. of filtered acidified urine from each of these animals was then injected intravenously into three young rabbits. After 72 hours the rabbits were killed. Those animals which had received urine from the pregnant cows showed small haemorrhages in the ovaries, an increase in the size of the Graafian follicles and hyperaemia of the uterus. The hormones, prolan A and B, are thought to be primarily responsible for producing these effects. The urine from the heifer produced no changes. On repeating this work, but injecting the urine subcutaneously, hyperaemia of the uterus was much more pronounced than in the first case.—J. A. Nicholson.

Plum, N. (1933). Om Hormoner, specielt Seksualhormonerne. [**On Hormones, particularly the Sexual Hormones**].—*Skand. Vet.-tidskr.* **23.** 289-302. [Summary in English : abst. from orig.]

A synoptic paper.—H. C. Bendixen (Copenhagen).

Collip, J. B., Anderson, Evelyn M., & Thomson, D. L. (1933). **The Adrenotropic Hormone of the Anterior Pituitary Lobe.**—*Lancet.* **225.** 347-348. 3 figs. [2 refs.]

Proof is produced to show that the thyrotropic and the adrenotropic hormones of the anterior pituitary lobe are separate substances. Injection of the latter hormone into hypophysectomized rats causes an increase of 50 to 300 per cent. in the weight of the adrenal gland. The substance is ineffective when administered orally and withstands boiling for 30 minutes.—Henry Dryerre.

I. Gill, D. A. (1933). **Length of Oestrous Cycle and Duration of Pregnancy in Ewes. Some Observations under New Zealand Conditions.**—*New Zealand J. Agric.* **47.** 305-307. 3 tables. [4 refs.]

II. Dry, F. W. (1933). **A Note on Length of Oestrous Cycle and Duration of Pregnancy in Romney Ewes.**—*Ibid.* 386-387. 2 tables.

I. A flock of 50 Romney ewes of varying ages was observed by raddling the brisket of the ram and removing daily those ewes which had been served overnight.

The gestation period was found to average 148·75 days. The oestrous cycle varied somewhat, but the majority returned in 15 to 18 days, which compared favourably with other records.

II. This article is a supplement to I. In this case the average gestation period was 148·7 days, and the oestrous cycle mainly 16 to 18 days.

—C. S. M. Hopkirk.

Girard, A. (1933). La Chimie des hormones sexuelles. [**The Chemistry of the Sexual Hormones**].—*Bull. Soc. Chim. biol. Paris.* **15.** 562-606. 3 figs. [94 refs.]

In this review of the present knowledge concerning the various sexual hormones, it is pointed out that the lutein cannot exert its characteristic action on the endometrium unless the uterus has first been subjected to the action of oestrin (folliculin). The hormones secreted by the ovary are influenced by the hormones, prolan A and B, secreted by the pituitary body. Prolan A produces ripening of the follicle and prolan B produces atresia of the follicle and the development of the corpus luteum. They are of the nature of polypeptides. Oestrin can be obtained directly from the urine of pregnant women, but urine from pregnant mares must first be hydrolyzed before the active oestrogenic substance is obtained. The hormone present in the urine of pregnant mares shows constant physical differences from that present in the urine of pregnant women.

By means of systematic fractionation the authors isolated a new substance—equilin $C_{18}H_{20}O_2$—from the urine of pregnant mares. This substance resembles oestrin in action and forms a large proportion of the total hormones present in the urine. A further substance—equilenin—has also been isolated from the same source. The different hormones do not appear simultaneously in the urine and are found in very different proportions.

A crystalline substance—$C_{16}H_{26}O_2$ or $C_{19}H_{30}O_2$—isolated from the testicles of bulls, has shown itself capable of producing growth of the crest when injected into capons. Like oestrin, it most probably arises from the breakdown of sterols.

—J. A. Nicholson.

Seifert, G. (1933). Untersuchungen über das Verhalten der Organ- und Körperlymphknoten des Hundes in den verschiedenen Lebensstadien. [**An Enquiry into the Behaviour of the Lymph Glands of the Organs and Body of the Dog at Various Stages of Life**].—*Inaug. Diss. Leipzig.* pp. 46. 3 figs. [35 refs.]

The author of this paper has made a study of the structure and function of the lymph glands of the dog and the changes which occur in them throughout life. Although variation was found to exist in the structure of the lymph glands in different parts of the same individual, no conclusions could be drawn as to the breed of dog and only slight indication of its age could be obtained. The difference in structure was found to depend primarily upon the difference in function. Thus, in those glands which are mainly concerned in absorptive processes, e.g. the mesenteric glands and the absorption of fat, the sinus-like enlargement of the lymph vessels surrounding the nodules is pronounced, whereas in those mainly concerned with the defensive mechanism, e.g. the tonsils, this arrangement is not well developed.

Slight differences in structure were noted between the lymphatic tissue of old and young dogs ; in the latter there was the impression of much fluid in the lymph nodules and the spleen showed only slight thickening of the capsule, trabeculae and vessel walls. Such histological findings may give some indication

as to the age of the animal, but an opinion must be expressed with extreme caution. —J. A. Nicholson.

Liebscher, W. (1933). Fütterungsversuche mit Saponinum pur. albiss. Merck als Zulage zum Schweinefutter. [**Feeding Experiments with Saponin as Supplement to Pig Feeds**].—*Arch. Tierernährung u. Tierzucht.* **9.** 156-177. 1 fig., 26 tables. [8 refs.]

In 1927, Kofler reported better utilization of food and shortening of the fattening period, particularly with young pigs, on supplying small amounts of saponin. The present author records comparative digestibility trials, and nitrogen balance experiments on young pigs, and two group feeding tests on fattening pigs (six in each group) using conventional rations except for the addition of from 0·05 to 0·15 g. of Merck's saponin per kg. body weight. The saponin neither increased digestibility nor improved live weight gains. One of the pigs became seriously ill and another died of what appeared to be saponin poisoning. The use of saponin is therefore condemned.—H. H. Green.

TECHNIQUE.

Condrea, P., & Roth, Hélène. (1933). Procédé d'élection pour la stérilisation des milieux de culture glucosés. [**The Best Method for Sterilizing Culture Media containing Glucose**].—*C. R. Soc. Biol. Paris.* **112.** 1497-1499. [1 ref.]

Text-books on bacteriological technique recommend that glucose media should be sterilized either by heating the media to 100°C. for an hour on each of three successive days or by heating the media and glucose solution separately at 110° to 115°C. for 15 to 20 minutes and then mixing.

The authors, however, found that glucose broth sterilized by the intermittent method was much darker in colour than that sterilized by 20 minutes exposure at 115°C. Attributing this to some change of the sugar they proceeded to make a quantitative chemical analysis of glucose after different methods of sterilization. They found that in alkaline media the reduction of glucose was dependent not only upon the temperature but also, in greater measure, upon the length of the exposure. The authors say, therefore, that the best method is to sterilize the media and the glucose separately by a 20 minutes exposure at 115°C. and then mixing. If, however, it is necessary to add the glucose to the medium before sterilization, it is preferable to use the same method, as this only causes a 28 per cent. reduction of glucose as compared with a 40 per cent. reduction when sterilization is carried out for 30 minutes on three successive days at 100°C.—Gwilym O. Davies.

Scott, J. P., & Brandly, C. A. (1933). **The Use of Reduced Iron for the Cultivation of Anaerobic Organisms.**—*J. Bact.* **26.** 1-7. 2 tables. [4 refs.]

These authors found that the addition of reduced iron to semi-solid or liquid media provides a simple method for growing anaerobic organisms. Anaerobes, grown in carbohydrate media to which reduced iron had been added, gave typical fermentation reactions. Reduced iron produced an active reduction of methylene blue, in contrast to the inhibition of oxidation which is produced by a vaseline seal. —A. J. Wilsdon.

I. Spray, R. S. (1933). **A Semi-Solid Medium for Anaerobic Cultivation.**—*J. Bact.* **25.** 38-39. [Paper read at 34th Ann. Meet. Soc. Amer. Bacteriologists].

II. Carpenter, Harriet M., & Long, P. H. (1933). **Experiments with Kendall's Medium.**—*Ibid.* 241-244. [2 refs.]

III. Swingle, Edith L., & Koser, S. A. (1933). **Experiments on the Use of the K Medium.**—*Proc. Soc. Exp. Biol. & Med. New York.* **30.** 1235-1237. [5 refs.]

I. The preparation of a suitable semi-solid medium for the cultivation of anaerobes is described. The advantages claimed for this medium are that good growths may be obtained without strict anaerobic conditions, that smears made from the medium can be clearly stained and that fermentation tests can be more easily carried out.

II. Kendall (1931) described a culture medium which was practically free from altered peptone and was definitely peptone-poor. In this medium he claimed to be able to cultivate filtrable cocci from the blood of influenza patients, individuals affected with the common cold, rabies virus and vaccinia virus. Typhoid bacilli and streptococci were converted into filtrable organisms when grown in this medium and he was able to recover staphylococci from staphylococcus bacteriophage.

These authors were unable to repeat Kendall's work although repeating his technique.

III. These authors also repeated the work of Kendall using cultures of typhoid bacilli and of *Staphylococcus aureus*. They were unable to confirm his results.—A. J. Wilsdon.

I. Stearn, A. E. (1933). **Rationalization, from the Viewpoint of Physical Chemistry, of the Behaviour of Bacteria toward Dyes, with Special Reference to Staining.**—*J. Bact.* **25.** 21-23. [1 ref.] [Paper read at 34th Ann. Meet. Soc. Amer. Bacteriologists].

II. Kaplan, M. L., & Kaplan, Leah. (1933). **The Gram Stain and Differential Staining.**—*Ibid.* 309-321. 8 figs., 1 table. [7 refs.]

I. An attempt to justify the view that the bacterial cell behaves as an equilibrated system of two classes of components, one being distinctly more acid than the other. Such a system is amphoteric. The behaviour of bacteria electrokinetically and towards staining, e.g. by Gram's stain, is discussed in the light of this concept.

II. Some idea of the permeability of bacteria to the constituents used in Gram's method of staining bacteria was obtained from the following types of experiment.

(a) By submitting bacteria stained with Gram's iodine to alcoholic solutions of low concentrations of iodine and noting whether decolourization took place.

(b) By treating organisms stained with crystal violet with a 0·08 per cent. solution of iodine in 85 per cent. alcohol and noting the resultant staining effects.

(c) By treating organisms with 0·1 N alkali, staining with methylene blue and decolourizing with Gram's iodine solution.

It is concluded that Gram-positive organisms have a low permeability to iodine in alcoholic solution. This, combined with the low alcohol solubility of the dye iodine compound, is suggested as the probable cause of dye retention of the positives in the Gram test.—W. R. Wooldridge.

Villain, G., & Comte, G. (1933). Pratique de la coloration en série des lames de sang en vue de la recherche des hématozoaires. [**Serial Staining for Protozoal Diagnosis**].—*Arch. Inst. Pasteur, Tunis.* **22.** 137-155. 6 figs. on 4 plates. [8 refs.]

The writers apologize for the length of their article, but believe that the procedure which they describe may be of good service in leading to consistency in results in the preparation of blood smears, in rendering serial examination possible, and in economy in reagents.

They refer to the inconsistencies, so often encountered in warm countries in the staining of blood smears for the examination of haematozoa, which are often attributed by workers to bad preservation, the water, defects of commercial eosinates or variations in the blue stains. After prolonged experience in different climates, they themselves have returned almost exclusively to the primitive procedure of GIEMSA, using separate aqueous solutions of azur II and eosin. They describe in detail the factors influencing the Romanowsky reaction and explain how errors can be avoided. Their procedure, based upon simple details of technique, cannot be reproduced at length but should be studied by workers in tropical veterinary medicine to whom accurate diagnosis, based upon efficient laboratory technique, is of such great importance.—LL. E. W. BEVAN.

ALI, M. (1933). Ein Apparat zur gleichzeitigen Pipettierung einer grossen Anzahl gleicher Flüssigkeitsmengen. [**An Apparatus for the Simultaneous Pipetting of Large Numbers of Equal Quantities of Fluids**].—*Zlb. Bakt. I.* (*Orig.*). **127.** 509-512. 1 fig., 1 table.

A series of 20 pipettes is linked together. The simultaneous suction of fluid is produced by means of lifting and lowering a column of mercury. The advantage claimed for this apparatus is that it saves time. The original must be consulted for technical details.—R. WETZEL (HANOVER).

I. BRAZIER, M. A. B. (1933). **An Electrical Method for Use in the Diagnosis of Diseases of the Thyroid Gland.**—*Lancet.* **225.** 742-744. 2 figs., 2 tables. [11 refs.]

II. —. (1933). **Measuring Thyroid Dysfunction.**—*Ibid.* 761.

I. The method employed depends upon measuring the resistance of the body to an alternating electric current and measuring its capacity. The ratio of these two factors gives what is called the impedance angle. Observations made upon 20 normal individuals showed this impedance angle to have a mean value of $0 \pm 2{\cdot}3$, with a standard deviation of 10·1. In 53 cases of thyrotoxicosis it had a mean value of $+22{\cdot}7 \pm 2{\cdot}1$ S.D.15·6. The impedance angle is independent of the basal metabolic rate, unless the latter is raised by thyrotoxicosis or by thyroid feeding. It is not necessary to rest or fast the patient before making the test which is carried out in less than ten minutes.

II There are many drawbacks to the basal metabolic rate method of investigating dysfunctions of the thyroid gland. The formulae methods of READ, or of GALE and GALE, have not proved entirely satisfactory, neither have the tests evolved by GOETSCH, BRAM and KOTTMAN. The electrical method based upon the work of GILDEMEISTER, and elaborated by BRAZIER [see above] seems to promise a solution of many of the difficulties. It is easy of application and causes a minimum of inconvenience to the patient. It remains to be seen whether this method is capable of distinguishing between the thyrotoxic and the pseudo-thyrotoxic patient. It is desirable that these investigations should be continued in the goitre clinics throughout the world.—HENRY DRYERRE.

RIECK, W. (1933). Eine neue Hauptner-Spritze mit selbsttätiger Dosierung. [**A New Hauptner Syringe with Automatic Dosage Control**].—*Tierärztl. Rdsch.* **39.** 348-350. 4 figs.

An illustrated description of a new Hauptner syringe having an ingenious pistol grip attachment which delivers a number of fixed doses without requiring any interference after the dose has been fixed on the filled syringe. The 10 c.c. syringes can deliver doses of 0·25, 0·5 or 1·0 c.c. and 30 c.c. models 1, 2, 3, 4 or 5 c.c. doses. These syringes are very advantageous for the inoculation of large numbers of animals with the same doses.—J. E.

Oppermann, T. (1933). Die Bedeutung des Guttadiaphots für die veterinärmedizinische Praxis. [**The Use of the Guttadiaphot in Veterinary Practice**]. —*Deuts. tierärztl. Wschr.* **41.** 545-548. 9 figs., 1 plate. [13 refs.]

During the past three years the author investigated the guttadiaphot method of blood diagnosis in its application to horses, cattle, sheep and swine. He considers that much of the previous veterinary literature is unsatisfactory, owing to the excessive claims made and to attempts to apply the technique as used with human blood to that of animals. The guttadiaphot method can only indicate abnormal blood irrespective of the cause, but practical experience shows that the blood in particular diseases (typically of a debilitating nature) gives a regular picture on the coloured strip.

In cases of malnutrition the result is positive and gives useful evidence, when clinical diagnosis alone may be uncertain. The guttadiaphot has also been employed in milk examination and has been claimed to be of use [Vetterleim. (1932). *Inaug. Diss. Hanover*].—J. E.

Langrishe, J. du P. (1933). **On the Use of a Pressure Steam Disinfector for Disinfestation and Disinfection, by Dry Heat and/or Gaseous Disinfectants.** —*J. Hyg. Cambridge.* **33.** 28-35. [7 refs.]

Dry heat at 55°C., acting for half an hour, kills lice in loosely suspended articles. It is useless for micro-organisms. Formaldehyde 7 per cent. in air at room temperature for one hour is useless. Sulphur dioxide 4 per cent. in air at room temperature kills lice and bugs in exposed situations in four hours, but it is considered unreliable for treating mattresses. Dry air at 50°C. followed by 5 per cent. formaldehyde vapour kills lice, bugs and micro-organisms, but is not practicable for articles such as mattresses, which contain much entangled air. The latter procedure is harmless to rubber, leather, furs, silks and woollens.

—Henry Dryerre.

MISCELLANEOUS.

Claude, A. (1933). **A Group of Chemicals Active in Increasing Tissue Permeability and Enhancing Certain Infectious Processes.**—*Science.* **78.** 151-152.

There is present in testicular and certain other tissues, and in certain micro-organisms, a substance which has the property of increasing tissue permeability and augmenting infectious lesions. It is not histamine, tyrosine or nucleic acid. It has been found, however, that the sodium or albumin compound of p-diazobenzol-sulphonic acid possesses this property. Intradermal injections of India ink in Ringer's solution, to which the above compound has been added, show a diffusion area 30 times greater than when the injections are made without it. It also enhances infectious processes.—Henry Dryerre.

Miessner, H. (1933). Wissenschaft und Wirtschaft in der Sowjet Union. Nach eigenen Reiseerlebnissen. [**Science and Agriculture in U.S.S.R. From**

Personal Observations in Russia].—*Deuts. tierärztl. Wschr.* **41.** 225-234 and 242-251. 32 figs.

A report by Miessner of his eight weeks visit with Zwick to Soviet Russia at the invitation of the President of the Lenin Academy for Agricultural Science in Moscow. Miessner speaks very frankly about the conditions of life in Russia and describes in detail the whole field of veterinary activities. There are 12,000 veterinary surgeons employed and paid by the government. Every province has its veterinary officer and two or three " feldschers " (persons given a special short course of an elementary nature and employed as subordinates to veterinarians) for outlying stations, who call in the veterinary officer only in serious cases or in outbreaks of disease. All treatment is free, and there are no private practitioners, but 12,000 is far too small a number to provide anything like an adequate veterinary service. Miessner points out serious defects in the " feldscher " system and advises its abolition as soon as sufficient qualified veterinary surgeons have been trained to take their place.—F. Bullock.

—. (1933). **The Dairyman and his Afflictions.**—*Austral. Vet. J.* **9.** 61-63.

An anonymous paper giving a general account dealing with various aspects of the dairying industry with particular application to Australia. It is pointed out that in the Commonwealth some two and a half million cows supply milk for human consumption. The total value of dairy products is approximately £18,000,000 annually, and of this the Commonwealth exports £8,000,000, the remainder being local consumption.

Australia is fortunate in being free from foot and mouth disease, rinderpest and, virtually, from contagious pleuro-pneumonia. The necessity for winter housing and, consequently, hand-feeding is relieved owing to the mild climatic conditions. Tuberculosis exists, but to nothing like the extent it does in Europe and North America. The chief afflictions are contagious abortion and contagious mammitis. To stimulate investigation of these diseases a National Dairy Research Council has been formed.

A brief discussion of the work done by Seeleman, in Germany and by the Bureau of Animal Industry in the United States of America is included and the cost of such work stressed.—H. McL. Gordon.

OFFICIAL AND OTHER REPORTS.

Government of India. (1932). **Annual Report of the Imperial Institute of Veterinary Research, Muktesar, for the year ending 31st. March 1932.** [Ware, F.] pp. 55. Calcutta : Govt. of India Central Publication Branch. [8vo] [2s. 6d.]

A report is given of the movements of the staff, the working of the estate at Muktesar, the production of biological products and the technical instruction given during the year. The main progress in research is discussed ; the publications of the staff are listed and the financial position is described.

Research.

In this report, for the first time, the results of work by the three newly constituted sections of pathology, serology and protozoology are set out separately.

Report of the Pathology Section. [Datta, S. C. A.]

Johne's Disease.—An attempt is being made to vaccinate new-born calves, [no details]. Spleen extract was used therapeutically on the experimental herds

but it was also found that " definite cases of Johne's disease have shown marked retrogression . . . after . . . . two years at Muktesar without any form of treatment." Environment is thought to be important. An attempt to produce a specific bacteriophage gave negative results.

Tuberculosis.—Three strains of tubercle bacilli from local cattle were taken to England for study. The " Muktesar avian strain " has been losing virulence and attempts to exalt it by passage through fowls and bulls failed.

Bovine Nasal Granuloma.—This common disease was studied and the association of *Schistosoma spindalis* was confirmed. A detailed account was published elsewhere [this *Bull.* **3.** 549]. Antimosan was tested for chemotherapeutic value and the preliminary results warranted further work. Transmission by contact does not occur as normal cattle housed with affected cattle did not contract the disease; the maximum period of test was eight years.

Bovine Enzootic Haematuria.—Schistosome adults and ova were found in the urine of six clinical cases.

Congenital Blindness in Calves.—An increasing number of cases occurs in different parts of India. Work along nutritional lines is desirable, but could not be started.

Pneumonia.—Two strains of pasteurella are being studied: one has been identified with *P. boviseptica*. *B. pseudotuberculosis rodentium* [*Past. pseudotuberculosis*] was isolated from a supposed case of miliary tuberculosis in a bull.

Bursati, Strangles, Kumri.—Work was continued. A nematode was found in diseased skin tissue from cases of bursati.

Sheep and Goat Diseases.—*Schistosoma indicum* was found in a nodular lesion of the small intestine of a sheep. A condition similar to or identical with contagious ecthyma of goats was encountered.

Canine Diseases.—Distemper virus received from England was found to be non-pathogenic for pariah dogs although it was still virulent after re-dispatch to England. Canine typhus was studied bacteriologically for salmonella organisms, but results were negative.

Fowl Diseases.—Strains of " avian distemper " [Ranikhet disease=Newcastle disease ?] virus imported from abroad died out. Fowl typhoid was diagnosed on two occasions during the year.

Helminthological Studies.—The serious fluke invasion of cattle in the Kumaon hills with *Fasciola gigantica* was studied. *Limnaea acuminata* was found to be the molluscan host. It is easily killed by dilute copper sulphate and danistol gave good results therapeutically.

A monograph on the helminth parasites of domesticated animals in India was prepared by Bhalerao [this *Bull.* **3.** 311].

Report of the Serological Section. [Haddow, J. R.]

Rinderpest.—The following miscellaneous findings are recorded:—(1) a certain proportion of calves immunized by various methods do not react and remain susceptible; (2) formalinized vaccines are effective but risky; (3) the serum-virus method was the most suitable for Indian cattle; (4) virus was recovered from the spleen of a bull given virus 74 days previously; (5) rinderpest infection has an incubation period of 24 to 36 hours after intravenous inoculation and a period of 100 to 120 hours after intrathecal inoculation; (6) goat passage removes piroplasmic contamination of virus blood: such contamination is also avoidable by using cerebrospinal fluid; (7) work with goat virus gave favourable preliminary results and (8) work on the concentration of immune serum by fractionation was begun.

Other Diseases.—The work on anthrax, blackleg, haemorrhagic septicaemia, bovine contagious abortion and septic pneumonia of calves is described. *Corynebact. pyogenes* was isolated from several cases of the latter condition.

Equine Diseases.—Systematic vaccination was applied to all mares in one stud infected with *Bact. abortus equi*. Results were not complete. In other studs where losses through abortion had occurred, mixed infection was encountered. As regards glanders, rough variants of *B.* [*Pfeifferella*] *mallei* were found unsuitable for the production of mallein. Several cases of joint-ill were investigated, either *Str. equi* or *Bact. abortus equi* being found.

Report of the Protozoology Section. [Sen, S. K.]

Surra.—Bayer 205 was found to be effective (5 to 8 g. intravenously per 1,000 lb. body weight) on six artificially infected ponies. Of two buffaloes infected with *Tryp. evansi*, one was given Bayer 205 and the other left untreated; neither became clinically ill.

Piroplasmosis.—Some cattle were inoculated with *Theileria* with negative results and one imported Dutch bull died of what was considered to be *Th. annulata* infection. Plasmoquine (5 doses of 16 c.c. of 1 per cent. solution) proved effective in an acute case of theileriasis in a hill bull, although ineffective in the case of the Dutch bull. Some new drugs are being tried out. Trypaflavine has been found useful against *Babesia bigemina* in cattle. An effective non-toxic dose of 25 c.c. of a 1 per cent. solution intravenously has been adopted.

An infection held to be anaplasmosis was found in an imported Ayrshire bull.

Some parasites similar to *Babesia sergenti* were found in four goats in association with mild anaemia.

Piroplasma [*Babesia*] *gibsoni* infection in dogs was studied: it appeared that continuous passaging caused an exaltation in virulence. Trypaflavine was useless as a curative in two cases (15 c.c. of 1 per cent. solution per 25 lb. body weight). Research on tick transmission was continued.

Other Infections.—Four cases of buffalo malaria were found. Transmission trials with *Aëdes albopictus* failed. Coccidial infection was found in one dog and one buffalo.

Tryp. lewisi was found in rats. The adhesion phenomenon using *Tryp. evansi* in rats was studied; the results were negative.

Entomology, etc.—*Aëdes albopictus* was found for the first time near Muktesar. The collection of ox warbles from hill bulls was continued. Larval forms were found in the spleen and lungs. A calliphorid fly occurring near Muktesar was studied. Sarcoptic mange was found in a pony. Larval *Linguatula senata* were recovered from the lungs of goats.

Annual Report of the Deputy Director, Imperial Veterinary Serum Institute, Izatnagar. [D'Costa, J.]

This report deals with the management of the institute and gives the number of doses of anti-rinderpest serum, anti-haemorrhagic septicaemia serum and of blackleg aggressin and serum made and issued. Statistical results are given as appendixes.—J. E.

—. (1933). **Report of the New York State Veterinary College at Cornell University for the Year 1931-32.**—*Legislative Document*. No. 18. pp. 190. 13 figs., 34 tables, 10 graphs. [140 refs.] Albany: J. B. Lyon Co.

Prof. Fish, former dean of the college, died in February, 1931 and Dr. Hagan was elected to succeed him in June, 1932.

The number of students reached a record figure during the year, namely 221, which is excessive in view of the accommodation available. To cope with the excess, it has been decided that all candidates for admission as students must have received one year's previous collegiate instruction.

Additional buildings and teachers are required to make the college course complete, but financial difficulty hinders this extension at present.

A commendable policy of arranging special lectures by outside workers in the veterinary or allied fields was continued, a list of lectures being given.

Each department of the college undertakes some original work to the extent that instructional work allows: this is briefly described. The results of such completed investigations, numbering 12, are published as separate articles, which occupy about two-thirds of the report. [These will be abstracted separately in this *Bulletin*].

Two two-day veterinary meetings open to practitioners were held during the year. At one, lectures on points of general interest were given and the other was a course on poultry diseases.

The report contains a list of the staff, a list of public lectures and articles prepared by them, the college budget and the statistical results of the work of the Ambulatory Clinic under Prof. UDALL, the Surgical and Consulting Clinics under Prof. FROST, the Small Animal Clinic under Prof. MILKS, the Diagnostic Laboratory under Dr. EVANS, the Diagnostic Work on Poultry Diseases at Ithaca under Asst. Prof. BRUNETT and the Report of the Poultry Disease Laboratory at Farmingdale, Long Island under Asst. Prof. HENDRICKSON. In the latter is a report on natural *Bact. pullorum* infections in pheasant chicks, hatched and reared in conditions excluding the possibility of infection from poultry.—J. E.

BOOK REVIEWS.

HURST, C. C. [Ph.D., Cambridge Univ., Fellow of the Linnean Soc. London]. (1933). **The Mechanism of Creative Evolution.** pp. xxi + 365. 199 figs., 1 plate, 3 tables. [6 pp. refs.] London: Cambridge University Press. [4to] [21s.]

This book can be thoroughly recommended to all who wish to enrich their conception of the world of living things by a knowledge of the modern science of genetics. It is a book which will prove of great value to students of the subject, but has a special appeal for those who wish to keep themselves well informed in all the branches of natural science. Hurst has not only summarized his subject well and written an excellent text-book, but has taken the philosopher's broad view and placed this science in its proper correlation with the rest of human knowledge.

Beginning with a brief account of the history of the subject, the various steps in the important advances which have been made are clearly and concisely described. The reader is led on through the discovery of the transmutations of chromosomes and genes to the creation of gene mutations by the application of X-rays, and the experimental creation of new species. It is the author's discourse on the momentous nature of this advance which gives the book its chief appeal to the general reader, and changes it from the mere collection of interesting works, that it otherwise would have been, to a living account of one of the most thrilling chapters in biology. The reader realizes that modern genetics has laid down the foundation for a science of experimental evolution which will eventually enable man to govern his own evolutionary development, and that of things around him.

A reference to " splint bones often thrown up by a young horse " which appears at the foot of page 315 is an unfortunate error which will disturb the veterinary reader ; but that is of small consequence in a book of so high a standard in its subject matter, authorship and publication.—E. L. TAYLOR.

EDELMANN, R. [Prof. Dr. Geheimer Medizinalrat, Ministerialrat i. R.] (1933). Johnes Trichinenschauer. [**Johne's Trichinosis Inspector**]. pp. viii + 112. 81 figs. Berlin : Paul Parey. 13th Edition. [RM. 4.50].

The translation of the full title of this book is :—" Guide to Trichinosis Inspection and Handbook for the Use of Official Veterinary Supervisors, based upon State and Provincial Regulations." It was first published in 1886 and gives all the information that the German trichinosis inspector requires on the morphology, physiology and life history of *Trichinella spiralis*, the various techniques used in the examination of suspected meat and the acts and orders controlling the inspection and marketing of meat. It also gives a little information on other helminth parasites which may be encountered in the course of trichinosis inspection, and notes on some of the principal infectious diseases of swine ; for the author considers that the trichinosis inspector should not become a mere machine for the detection of trichinae, but should be encouraged to take a wider view of his work and know more of meat inspection in general.

The present edition has been brought up to date by Professor Richard Edelmann and represents a complete digest of information on trichinosis inspection as practised in Germany.—E. L. TAYLOR.

LEIGHTON, G. [O.B.E., M.D., F.R.S.E., Medical Officer (Foods) Dept. Health for Scotland]. (1933). **Pocket Handbook of Meat Inspection.** pp. viii + 137. 1 appendix. Edinburgh & London : Wm. Hodge & Co., Ltd. 2nd Edition. [8vo] [6s.]

This is a guide to the " Public Health (Meat) Regulations (Scotland), 1932 " and contains the main clauses of these regulations accompanied by explanatory comments by the author. This second edition of Dr. Leighton's book is quite up-to-date in respect of the present-day meat inspection regulations for Scotland, the former regulations having been amended several times since the issue of the defunct Scottish Board of Health's regulations of 1923.

The book is of course very valuable to meat inspectors and also to veterinary students in Scotland, as it gives in a simplified and annotated form the substance of the regulations. Scotland is now in the happy position of having a unified meat inspection system and its people are fully assured of satisfactory protection against unsound meat, as over 90 per cent. of home-killed meat passes through public abattoirs and the small number of private abattoirs still in existence are effectively licensed and inspected.—J. E.

I. RIVOIRE, R. (1932). Les acquisitions nouvelles de l'endocrinologie. [**New Light on Endocrinology**]. pp. 181. Paris : Masson et Cie. [Fr. 26].

II. FIESSINGER, N. (1933). Physio-pathologie des syndromes endocriniens. [**Endocrine Syndromes**]. pp. 317. 43 figs., 2 tables. Paris : Masson et Cie. [Fr. 40].

I. During the last decade, knowledge concerning the ductless glands has been accumulating rapidly and in this book the author has given a short account of the progress which has been made in this subject. Perhaps the greatest advance in endocrinology has been the isolation of many of the hormones in a pure state.

This has been of great importance from the clinical point of view and now permits of the recognition of hypo and hyper-function of the ductless glands.

The arrangement here adopted has been to treat each gland separately, giving a short account of the preparation, where known, of the active hormones and their physiological actions in the body. Then follows a description of the clinical syndromes produced in the human subject when the gland under discussion becomes diseased. Whilst there is a tendency to keep the functions of the ductless glands in watertight compartments, nevertheless the book serves a useful purpose in assisting to bridge the gap between the physiologist and the clinician.

II. Since endocrinology has come to play such an important part in medicine, it is essential that this science should be based upon the sure foundations of experimental physiology and pathology. Unfortunately this has not always been the case, and this book has been written in an attempt to return to the solid ground of experimental and clinical facts. It is primarily intended for students and doctors and is limited to the confines of physiology and medicine.

The individual glands are dealt with in an orthodox manner, and a description is given of the symptoms and treatment to be adopted when one or other of the glands becomes diseased. Chapters on the internal functions of the liver, spleen, kidneys and mesenchymatous cells are also included. Whilst these organs are not strictly endocrine glands, nevertheless they secrete physiologically active substances into the blood stream and the author has felt justified in considering them here. The veterinary reader will perhaps find most interest in the sections concerned with the therapeutic uses to which the various active substances may be put.

—J. A. Nicholson.

Pinto, C. [Dr. Med., Professor interino de Higiene, Chefe de lab. do Instituto Oswaldo Cruz]. (1933). Profilaxia das Doenças Infecciosas e Parasitarias dos Animais domesticos do Brasil. **[The Prophylaxis of Infectious and Parasitic Diseases of the Domestic Animals of Brazil].** pp. vi+308. 186 figs., 26 plates, 4 tables, 1 graph. Rio de Janeiro : Tip. do Ministerio da Agricultura. [4to].

The book covers a wider field than is implied by the title. The pathology, bacteriology, distribution and incidence in Brazil, and the diagnosis and prophylaxis of the commoner bacterial diseases are dealt with at some length. Protozoon diseases are similarly treated, considerable space being devoted to their vectors. The third part of the book is devoted to helminths and arthropoda and the pathological conditions they cause.

Although the book is intended for the use of Brazilian students, it is also of interest to English pathologists as it affords easy access to information concerning the incidence or prevalence of the more general infectious and parasitic diseases in Brazil. Another interesting feature is that much of the literature drawn upon by the author, being in Portuguese, has probably escaped the attention of many research workers. The absence of a bibliography detracts from the value of the work. The book is well illustrated.—R. S. Roberts.